

**Municipal Library,
NAINI TAL.**



Class No _ 940.45

Book No. _ B 116 D

II

THE DOVER PATROL

1915—1917

VOL. II

THE
DOVER PATROL
1915—1917. By ADMIRAL SIR
REGINALD BACON, K.C.B.,
K.C.V.O., D.S.O.

WITH 101 ILLUSTRATIONS, 12 CHARTS
AND 21 PLANS AND DIAGRAMS

VOL. II

LONDON
HUTCHINSON & CO.
PATERNOSTER ROW

CONTENTS

VOL. II

CHAPTER XII

THE INCOMPARABLE 6TH FLOTILLA

Service for "hostilities only"—The exacting routine of the destroyers—Too few boats—Enemy's advantage in gun-fire and speed—"Tip-and-run" raids—Their influence on German officers and men—Ill-formed criticism—Suspicious preparation at Ostend—A "shoot and scoot" excursion—An official memorandum—The evolution of the <i>Zubian</i> —Enemy boats—The raid of March 1st, 1917, and its lessons—Bombardment of Ramsgate and a dash into the Channel—The <i>Swift</i> and <i>Broke</i> in action—A German wreath and its sequel—Casualties and their causes—A final tribute to officers and men of the Flotilla	pp. 327-364
THE TRIBALS	p. 365

CHAPTER XIII

THE DOWNS AND MERCHANT SHIPPING

Origin of the examination service—The Downs boarding flotilla—Captures of German agents and contraband—The work of the armed drifters—The capture of the <i>Virgen del Socorro</i> —Destroyer and air-raids—Losses of the civil population—Landing 6-inch guns	pp. 366-389
THE GRAVEYARD	p. 390

CHAPTER XIV

THE BARRAGES IN THE CHANNEL

The earliest form of barrage—Its mechanical impossibility—Breakdown and removal—New types of mine and net barrage instituted—Further difficulties owing to mine-dragging—Removal of the barrage and its relaying—General review of the defence—A mine-ladder scheme—Delay in laying the Folkestone mine-barrage owing to mines not being available—Additional proposals—The Barrage Committee—General remarks on the working of the barrage—Approval for shallow mines obtained	pp. 391-413
THE DOVER STRAITS ROULETTE	p. 414

CONTENTS

CHAPTER XV

THE DRIFTERS AND THEIR WORK

Early history of the drifters—Description of drift-nets to catch submarines— Difficulties encountered—Use of mine-nets—The Zeebrugge Zareba— The Ostend bombardment—Work in West Deep—The <i>James Fletcher</i> rams a submarine—Laying the barrage off the Belgian coast in 1916—The loss of the <i>Clover Bank</i> —The adventure of the 9th Division—Capture of the <i>Au Fait</i> —The Goodwin-Snou barrage—The raid of October 1916— Gallant behaviour of the drifters—Engagement with sea-planes—Salvage operations—Laying the 1917 barrage on the Belgian coast—Work on the Folkestone mine-barrage	pp. 415-441
WATCHING THE DOVER STRAITS	p. 442

CHAPTER XVI

THE FRENCH COAST

The relations between the British and French Admirals—The martyrdom of Dunkirk—Two hundred and fourteen bombardments—The Commodore—The danger of the Roads as an anchorage—The left flank of the Army—Possibility of a German landing—The King and Queen of the Belgians—The doings of the French Patrols—The R.N. siege-guns and emplacements—The British Army's evacuation of the coast	
	pp. 443-464
DUNKIRK	p. 465

CHAPTER XVII

C.M.B.'s, M.L.'s, SUBMARINES AND SMOKE

The coastal motor-boat, its uses and limitations—High speed and invisibility —Checks on impatience for action—An incident off Zeebrugge—A narrow escape—Firing torpedoes inside the Mole—The arrival of motor-launches —Experiments with smoke-screens—Exploratory sweepings for mines— Submarines at Dover—A time of weary waiting—Spotting for the monitors —The best colour for submarines to avoid detection below water	pp. 466-483
SMALL CRAFT	p. 484

CONTENTS

vii

CHAPTER XVIII

OPERATIONS

The necessity of secrecy in planning operations—Improbable methods of attack should be attempted—Value of shoals—Care in wording signals—Discrimination in deciding what operations should be undertaken—Precautions in cancelling operations—The value of uncertainty on the part of the enemy—Co-operation of Navy and Army on a coast—The peril of the mine-fields—Friendly submarines—Experience and rapidity of decision—Responsibilities of senior officers—Relations between the Admiral and officers in charge of detached operations—The Operations Committee at the Admiralty—Relations between such a body and an Admiral in command—Thinking round an operation—Imagination and experience in a commander	pp. 485-518
EXPERIENCE	p. 519

CHAPTER XIX

THE AIR SERVICES OF THE DOVER PATROL

Sea-planes and aeroplanes—Aerodromes at Dunkirk—Development of photographing reconnaissance—Early and late types of machines—Encounter with the enemy—Attack upon Zeppelins—Interception of aeroplanes raiding England—The provision of aerodromes—Persistent attack on the Dunkirk aerodrome—Intercepting German airships—A sea-plane brought down by a submarine—Work of the Royal Naval Air Service with the Army—Continued attacks on enemy aerodromes—Lighter-than-air machines at Capel and Polegate	pp. 520-577
THE STRAFE OF A KITE-BALLOON	pp. 578-579

CHAPTER XX

DOVER HARBOUR AND DOCKYARD

The inner harbour—An abandoned scheme—The defence of the port—Divided control and its dangers—Development of the Dockyard—Increase of salvage work—Success of Captain Iron—Co-operation of the ladies of the port—Attempts to waylay the Zeppelins—The value of words of praise	pp. 580-596
THE TIDES	p. 597
EPILOGUE	pp. 598-609
L'ENVOI	p. 610

CONTENTS

APPENDIX I

	PAGE
NAVAL CO-OPERATION WITH THE ARMY IN THE AUTUMN OF 1914	611

APPENDIX II

SALVAGE AND OTHER SERVICE RENDERED TO VESSELS BY CAPTAIN JOHN IRON AND THE DOVER SALVAGE TUGS	619
--	-----

APPENDIX III

DESTROYERS AND TORPEDO-BOATS OF THE ORIGINAL 6TH FLOTILLA	625
--	-----

APPENDIX IV

DESTROYERS, P. BOATS, AND M-MONITORS WHICH JOINED THE 6TH FLOTILLA AND CRUISERS ATTACHED TO THE PATROL	628
--	-----

APPENDIX V

MEMORANDUM ON VISIBILITY BELOW WATER	631
--	-----

APPENDIX VI

NAMES OF MASTERS OF CROSS-CHANNEL TRANSPORTS	634
INDEX	635

ILLUSTRATIONS

LIST OF PLATES

VOL. II

ADMIRAL RONARC'H	<i>Frontispiece</i>
PLATE	FACING PAGE
LXI. THE OBT-REPORTED PERISCOPE	360
A FRENCH TORPEDO-BOAT AFTER BEING MINED	360
LXII. H.M.S. "VIKING" AFTER BEING MINED	361
LXIII. H.M.S. "NUBIAN" ASHORE AT THE SOUTH FORE- LAND AFTER HAVING HER BOW BLOWN OFF BY A TORPEDO	362
BOW OF H.M.S. "MILNE" AFTER RAMMING A GERMAN SUBMARINE	362
LXIV. FUNERAL OF A BRITISH FLYING OFFICER AT OSTEND	363
LXV. GRAVE OF BRITISH FLYING OFFICER AT OSTEND	364
LXVI. DRIFTER AFTER BEING SHELLED BY GERMAN DES- TROYERS	365
LXVII. CHART OF BARRAGE OF NETS LAID BY DRIFTERS TO PROTECT THE FLEET DURING THE BOMBARDMENT OF ZEEBRUGGE, AUGUST 1915	421
LXVIII. CAPTAIN F. BIRD AND HIS DRIFTER FLAGSHIP THE "EAST BRITON"	444
LXIX. ADMIRAL RONARC'H AND HIS STAFF	445
LXX. BOMBARDMENTS OF DUNKIRK FROM LAND, SEA, AND AIR	446

ILLUSTRATIONS

PLATE	FACING PAGE
LXXI. THEIR MAJESTIES THE KING AND QUEEN OF THE BELGIANS	452
THEIR MAJESTIES THE KING AND QUEEN OF THE BELGIANS ON BOARD H.M.S. "ATTENTIVE" .	452
LXXII. GENERAL ROUQUEROL AND PRINCE ALEXANDER OF TECK	453
LXXIII. INSPECTION OF ROYAL NAVAL AIR FORCE AT DUNKIRK BY H.M. KING GEORGE V. . . .	458
LXXIV. THE OBSERVATION TOWER AT NIEUPORT . .	459
THE REMAINS OF THE MAIN SQUARE AT NIEUPORT	459
LXXV. GERMAN DESTROYERS RUNNING AWAY FROM THE AEROPLANE THAT OBTAINED THE PHOTOGRAPH, THINKING SHE CARRIED BOMBS—BUT SHE DID NOT!	468
LXXVI. 40-FEET COASTAL MOTOR-BOAT RUNNING AT FULL SPEED	469
A DIVISION OF C.M.B.'s AS SEEN FROM THE AIR .	469
LXXVII. STARTING AN OVERHEAD SMOKE-SCREEN FLOWN BY A KITE	464
EXPERIMENTS TO OBTAIN NEUTRAL TINTED SMOKE, BY MIXING BLACK AND WHITE SMOKE . . .	464
LXXVIII. CHART OF DOVER HARBOUR, SHOWING DISPOSITION OF ANCHORAGE	580
GENERAL CHART OF THE DOVER AREA, 1917 . . .	END OF VOL. II

LIST OF DIAGRAMS IN TEXT

DIAGRAM ILLUSTRATING ACTION BETWEEN H.M.S. "SWIFT" AND H.M.S. "BROKE" AND GERMAN DESTROYERS . . .	355
DIAGRAM OF FOLKESTONE-GRISNEZ MINE-FIELD . . .	402

THE DOVER PATROL

CHAPTER XII

THE INCOMPARABLE SIXTH FLOTILLA

Service for "hostilities only"—The exacting routine of the destroyers—Too few boats—Enemy's advantage in gun-fire and speed—"Tip-and-run" raids—Their influence on German officers and men—Ill-formed criticism—Suspicious preparation at Ostend—A "shoot and scoot" raid—An official memorandum—The evolution of the *Zubian*—Enemy boats—The raid of March 1st, 1917, and its lessons—Bombardment of Ramsgate and a dash into the Channel—The *Swift* and *Broke* in action—A German wreath and its sequel—Casualties and their causes—A final tribute to officers and men of the Flotilla.

My heart warms to the task of writing a chapter on the 6th Destroyer Flotilla. The very words "6th Flotilla" bring back a flood of memories of incidents and details, largely uninteresting in themselves—of gales of wind, snow and fog, hot weather and brilliant sunshine, long dark nights, moonlight and haze—and the Flotilla always with steam up, always at work. I worked them hard—perhaps, it may be said, too hard—but it had to be done. They were always cheery, always ready for more. From the commencement of hostilities down to the end of 1916, no other destroyers were attached to the Dover Patrol, except, at times, half a dozen good boats which were lent from Harwich to lie at Dunkirk, as a reserve to support the Belgian Coast Patrol, but these were not allowed to take part in the work of the patrol. And here, let me at once say that if any destroyer officer or senior officer objects to the eulogistic term "incomparable"

being applied to one particular flotilla, let him make allowance for the feelings of an Admiral who, during the Great War, was served so well, so incomparably well, by the destroyers under his command.

The 6th Flotilla, the monitors, and the submarines were the only vessels manned by active service ratings of the Royal Navy in the Dover Command, and these had a large sprinkling of men entered for "hostilities only." The latter did their best, and it was good work, but they lacked the training in boat-work and general duties that all the active service ratings in the Navy had been through. The sailor—that is, the old seaman—was apt to view them with a critical eye. Their shortcomings to him were more apparent than their virtues, and undoubtedly their lives were none the easier for this; but the willingness was there, and they were as plucky and enduring as any.

The following story illustrates the superior attitude that at times was assumed towards them by active service ratings. A collision between two destroyers had occurred, and in one boat a man was badly jambed, and was shouting a good deal. The captain of the uninjured destroyer told his coxswain, an old sea-dog, to go over the bow into the other boat and have the injured man brought on board and put into the captain's cabin. The coxswain returned and said, "You can't have him down there, sir; he's all covered with blood." "Never mind that," said the captain; "we can always clean up afterwards. Go back and tell the surgeon to have him brought over." Again the coxswain returned. "I've seen the surgeon, sir," he said, "and he says it's no good; he's bound to die whether he is moved or not; but you needn't be put out about it, sir, as he's only one of them joined for hostilities only." Yes, perhaps; but, like a good many others joined for hostilities only, the "only" meant life given to the service of his country.

The routine of the Dover destroyers was to have steam on

the engines, either at sea, or in harbour, for seventeen days in succession; then to spend three days laid up for boiler-cleaning, and once every four months they had twenty days in the dockyard for coating the boats' bottoms, and making defects good. During the seventeen days when in harbour, officers and crews remained on their vessels, ready to slip instantly to reinforce the Patrol, or to hunt vagrant submarines sighted in the Channel. It was the instant jumping on submarines with all available destroyers that kept the Narrow waters free from their depredations.

It has been stated that submarines did not operate near Dover, because they wished us to believe they did not pass. That is all nonsense. But they knew that, the moment they were sighted in the Narrows, they had to go somewhere to the bottom and sulk, listening to the waters near being thrashed by the propellers of their deadly enemies, the destroyers. The enemy's targets were many, but close in shore and well guarded. No, the waters were not healthy as hunting-grounds for the enemy submarines. This immunity from losses was bought at the expense of overwork by the 6th Flotilla. The principle I acted on was that we were at war. War happened only once in a life-time, and therefore every one had to be prepared to expend the energy of a life-time during the war.

Again, on any misty day with a visibility of, say, not more than five miles, the enemy might have tried a raid on our cross-Channel transports. Our force was very weak, but, whatever happened, every destroyer, not boiler-cleaning, would have been ready to engage to prevent the raid or to get some satisfaction out of the enemy before he left. Had we had three times the destroyer force, I could have arranged for an easier routine, but, as numbers stood, this was impossible.

Once one destroyer arrived from the North to increase our numbers, and, after making fast to a buoy, asked permission to let fires out. This provided amusement for the 6th Flotilla for quite a long time. As far as possible the

destroyers had twenty-four hours at sea, and twenty-four hours in harbour. At sea, the captains were almost invariably on deck the whole time. It was not like deep-sea cruising or convoy work in the open. From one minute to another it was impossible to say what might turn up, and there was usually no time to lose when the turn-up happened. In harbour the boats had to oil, and lay there with steam on the engine; so that only the smallest engine defects could be put to rights.

During the dark periods of the month—that was during the first and last quarters of the moon—the majority of the division at rest anchored for the night in the Downs, unless the weather was such that a raid was impossible. This was by no means all joy, as, with a wind of any strength, in any quarter, except from W.S.W. through north, to N.N.E., a sea set into the anchorage; and, as the destroyers usually rode to the tide, they were apt to roll badly, so that a night's rest was more nominal than real. The captains, moreover, in the Downs usually preferred to sleep in their charrhouses. I tried to dissuade them from doing this, since there was always time for them to be called before the engines could move and the cable be slipped; but, at the same time, it was easy to appreciate their point of view.

The net result was that, at these periods, a captain got only one good night's rest in four, and, if lucky, one day's rest in four also. It was from the boats *resting* that destroyers had to be provided for taking distinguished officials across the Channel. Perhaps these gentlemen can now understand why requests for a destroyer were not received with overflowing cordiality, but rather grudgingly. It was marvellous how the boats were kept running at such high pressure, especially as the Tribals were ten to twelve years old, and the 30-knotters out of date, and practically ready for the scrap-heap, before the war started. In fact, the latter were barely safe for Channel work in the winter of 1917-1918. Their engine-room staffs and the dockyard officials under Engineer-Captain

William B. Parsons and Mr. Smart and Mr. Ramsay, deserve great credit for their efficiency, since hardly ever was a boat broken down for engine defects and unable to take her turn of duty. Nor did the officers and crew suffer abnormally. None of the captains ever broke down, although, as their three days' stand-off for boiler-cleaning approached, they also approached their limits of endurance, and I could see by their pinched looks that they were badly in need of rest.

The disposition of the patrols varied greatly. The patrol positions were constantly changed. It should be a governing principle to do this in war-time. It is impossible to tell how far the enemy has observed the areas guarded. The night patrols were never taken up till after dark, and these were varied for every dark period in case the enemy's submarines had observed their positions. It was largely owing to this that the *Broke* and *Swift* dropped on the German raiders, since the German's line of retreat led them on to these flotilla-leaders in a position where no day patrol had ever been placed.

We had far too few destroyers at the commencement of the late war. Why was this? Was any one culpably negligent in the matter of pre-war supply? Unhesitatingly I say, No! What led to this shortage was the impossibility of forecasting the trend that the war would take, unless human beings had been endowed with the spirit of inspired prophecy. It was thoroughly appreciated that the Grand Fleet would require destroyers; but the occupation of the Belgian coast, and the consequences which followed from that occupation, were never anticipated. If it had not been for the German continued retention of the Belgian coast, our numbers of destroyers would not have been greatly deficient.

It must also be remembered that the yearly provision for the programme of naval construction was extracted from the Government of the day with considerable difficulty. Every increase had to be defended, and, short of inspired prophecy, it was not easy to supply adequate reasons for doubling our destroyer force in peace time. It would have meant adding

£16,000,000 to the construction programme and a corresponding increase in personnel to meet our full requirements. Increase in personnel meant an increase in a vast number of unproductive charges, such as training costs, barracks, pensions, victualling, etc., etc. It is easy now to blame previous administrations for our deficiencies, but it would have been impossible, in pre-war days, to defend such an increase.

But again our Dover 4-inch Tribals were inferior in some other respects. The reason of allocating the Tribals to Dover, was that their small fuel-carrying capacity made them unsuited for work with the Grand Fleet. This did not militate against their efficiency at Dover. The Tribals mounted only two 4-inch guns against three carried by the German boats, and the range of their guns was considerably less. Why was this? Well, the Tribals dated back to the original Dreadnought programme of 1905. Let us thank Lord Fisher for having insisted on oil fuel, and fast sea-worthy boats, rather than quibble because, though they had then an armament equal to any destroyer then afloat, evolution enabled heavier armaments, eight years later, to be adopted. As regards range, this was limited by the small elevation that it was possible to get on the guns. Increased elevation meant increase of weight, and in turn increase of weight meant loss of speed. The accepted idea of destroyer actions in pre-war days was a close action. It was never anticipated that destroyers, being light, quick-rolling craft, would engage each other at ranges of over 12,000 yards, or 7 miles. It was, therefore, wisely considered wrong to handicap speed in order to obtain a range that most probably would never be used. Who could have anticipated that destroyers would lie under the protection of shore batteries and shell our boats on the Belgian Patrol line? It would have been considered to be freak warfare, and so it really was; and, although we at Dover suffered from the lack of range in our destroyer guns, I still consider it to have been a wise decision not to sacrifice speed in order to secure increased range.

In one particular the Germans were ahead of us, and showed greater foresight and insight, and that was in providing their destroyers with more torpedo-tubes. The reason for this is not hard to see. If the history of naval arguments expended in debates were ever to be written, one of the wonders would be the antagonism of a certain school of naval thought to the torpedo. The uphill work we younger torpedo officers in the penultimate decade of last century had in pressing the value of the torpedo on the older officers was phenomenal. The idea that the British Fleet had only to meet an enemy to beat him was an ingrained canon of naval opinion.¹ To try and argue that modern weapons had to be met by new tactics, and that these innovations could not be discounted, was to be told bluntly that it was all nonsense. This old theory of warfare took a long time to die. It led to the idea that our destroyers would be used mainly to fight enemy destroyers. Our Fleet could always account for the enemy's Fleet, if we could stop their torpedo attacks; therefore the main function of our boats was protective to our own battle-ships rather than offensive to those of the enemy.

With the Germans the opposite opinion was naturally held. To them the destroyer offered the means of equalising battle-ship strength; therefore torpedo-tubes were the great essential. Now this, curiously enough, was probably responsible for the superior night tactics of the enemy destroyers in a destroyer action—namely, that the torpedo was their first and deadly weapon, and the gun only an arm for secondary use. A sounder theory was never started. Gun-fire at night, even with good screening,² dazzles the eyesight. True it is that

¹ One distinguished Admiral, with a considerable reputation as a strategist and tactician, was invited to stay with the staff officers of the *Vernon*, to discuss the torpedo question. After many hours of debate, his considered opinion was as follows: "I cannot believe in the torpedo without losing faith in the battle-fleet; as I cannot bring myself to disbelieve in the battle-fleet, I cannot believe in the torpedo."

² Screening is effected by the use of screens which keep the flash at the muzzle of the gun from being seen by those whose duties necessitate acute vision.

good screening reduces the dazzle, but when the eye is straining to catch the faint variations in shade which constitute night vision, any sudden access of light is detrimental. The Germans, in all our scraps, withheld their gun-fire at first and used their torpedo-tubes, like revolvers, with deadly effect. This is the only tactic in which, so far as I know, the enemy showed any superiority over us—and it is only fair to credit them with having put into practice a radically new tactical truth.

As soon as I tumbled to this, I asked the Admiralty to give me any old 14-inch torpedo-tubes they could spare, and as usual, the Department of the Director of Naval Ordnance responded splendidly. Dover Dockyard was able to fit all our larger boats with two fixed 14-inch tubes, so that the torpedoes could be fired from the bridge—but this was not done till we had learned a bitter lesson.

The speed of our destroyers, being old boats, was less than that of the Germans. Thirty knots was all we could rely on. In one or two boats, if their bottoms were clean, perhaps thirty-one knots could be obtained; and the Germans could steam thirty-three knots. No doubt this advantage was also emphasised owing to the Germans having the initiative; they could raid any night they liked, docking and cleaning their boats immediately before a raid; whereas our boats had to cruise every night and meet the enemy with dirty bottoms. The net result was that we could never overtake and steam them down—a considerable handicap in bringing them to action.

I have previously mentioned the necessity that was imposed by our shortage of destroyers of husbanding that meagre force. I made it my business never, if I could help it, to expose my boats to a superior force of German destroyers. It is a cardinal principle in the British Navy to fight the enemy if possible and not to run away, and it cannot be too strongly emphasised that this principle should be always acted upon provided the opposing forces are reasonably matched, or—and this is

important—in any case if your boats are fighting on the defensive. To countenance running away is to breed dry-rot in any fighting force, and that is why the Germans came to such utter grief. Their tip-and-run raids on the Dover Straits absolutely destroyed the morale of their officers and men. The idea that their main object was to get back to harbour safely, and not that their main function was to attack and sink our vessels, resulted in the utter futility of those raids. This extended even to daylight scraps, when a superior force on occasions broke off an engagement and made for home. The result was loss of confidence in themselves. Never could the German destroyer flotillas on the Belgian coast be looked on as a fighting force. It was really painful to see a naval force so absolutely devoid of the naval fighting spirit. This must have been deep-rooted in their whole Navy, and led to the lamentably sad spectacle of the surrender of the fleet in 1918. For it must have been intensely sad for any naval officer to witness such a degradation of the sea spirit which for centuries had inspired the maritime nations of the world.

But to return. I made it my business never, if I could avoid it, to put the destroyers in a situation of inferiority. But in the defence of the Straits it was rarely possible to attain this condition. There, if one destroyer met six, it was her business to fight and fight to the last. This, needless to say, suited our officers and men, and it was their legitimate duty. They may sometimes have chafed under the restrictive orders on the Belgian coast, but in the Straits when they were defending our Patrol and traffic they could, and did, fight all they wished. There was no dry-rot in our service.

When, as was not infrequently the case, the destroyers in harbour were turned out at night to reinforce the Patrol, there were two signals—one was for the boats to proceed to the spot indicated, singly, at utmost speed, and the other signal was to wait and to concentrate outside and proceed in company. The difference in these two conditions may further explain the

above principle. If our traffic line, or the unarmed patrols, were being attacked, I sent the boats at the utmost speed, regardless of supporting one another, as one boat at night could frighten several German raiders. At all events, she would attract the attack off the unarmed vessels, and her supports would arrive in succession at short intervals.¹ But, if merely a gun-fire raid was the programme of the enemy, then the matter became one of fighting the German division, and the boats were delayed to sail in company. It is true that, in the first case, the boats incurred risks of being sunk in succession, but the risks were such as had to be incurred, and it increased the morale of the unarmed patrol, who knew that help would be coming at the maximum rate.

Again, in 1915 and 1916, our destroyers being few, and the boats having often to work singly, whenever an operation was about to come off, and the patrols were altered in disposition, I used to meet all the captains of the boats and explain my views, and discuss the possible trend of events and the action of the enemy, and the reasons that underlay my disposition. By this means the captains knew my views and how to carry out the spirit of the orders, in case totally unexpected conditions arose. Later on, when the boats became more numerous and worked in divisions, I saw the leaders only. Such a procedure is of the greatest value, for, whatever might happen, I knew that the boats would act to attain the end we had in view, according to the judgment of the commanding officers at the moment. But it was always advisable to write the governing principles of the actions of the destroyers in memo. form, since when new boats occasionally arrive, I was apt to forget that their knowledge was deficient in the above respects.

One particular form of operation which I hated more than another was that of trying to cut off the German destroyers among our mine-fields near the Dutch coast.² On those

¹ Numbers at night are tactically of far less importance than in daylight.

² See Chart of Patrol, latitude $51^{\circ} 30' N.$, longitude $3^{\circ} 10' E.$

occasions we had only vague information that they were out ; their numbers were unknown ; and my destroyers were priceless to me for the defence of the Straits. If I lost any, they could not be replaced, whereas the enemy had large numbers to draw on. A night scrap is always a toss-up, a matter largely of luck, unless you can chase in the open. If my boats were damaged, they would be taken by the flood-tide over our mine-fields towards Zeebrugge, where salvage in daylight was very difficult. The game was never worth the candle. The few destroyers available at Dover made it undesirable to let them be entangled off the enemy's ports in an engagement with an uncertain number of enemy vessels at night. The course decided on between the Admiralty and myself after discussion, was that the Harwich force should be looked on as the main attacking body ; they, however, were not permitted to pass to the southward of a certain definite line unless engaging the enemy ; our vessels, on the other hand, were not allowed to pass to the northward of a similar line, so that no regrettable incident between the two forces could occur. The Dover force was to supplement the Harwich attack by cutting off the enemy from Zeebrugge, but unless the enemy were engaged by the Harwich force our boats were to lie to the westward of our mine-field. Taking into account our small numbers, the work they had to do daily, and the proximity of the place of probable action to Zeebrugge, this decision was a wise one. In view of our shortage of destroyers, it would have been an unjustifiable gamble deliberately to court, unsupported, the chance of a night scrap with an enemy of unknown strength close to his harbours. I have no doubt our destroyer crews, both officers and men, chafed under such restrictions, but an Admiral should use his vessels to the best possible advantage to the country, even if in so doing outlets for gallantry are denied to those serving under him.

The raids by the German destroyers on the Channel were a phase of the work with which the 6th Flotilla was closely associated, and are best treated together, Up to the last few

days of October 1916 enemy destroyers had never ventured to attack at night. But every night precautions were taken to defend our vital points. In an offensive, the Admiral should of course be afloat, except in small undertakings, when obviously it is only fair to give the senior officer of the flotilla charge of an operation. If an attack on the Straits was expected, the flag-officer's right place was ashore at the centre of the system of telephonic communication, and the signal station. It was useless, in so large an area, in cases of tip-and-run raids, to attempt to control dispositions when afloat, especially as the probability was that, wherever his vessel might be, it would be at least ten miles away from the actual point of attack.

It might perhaps have been an advantage if some civilian critics of the Patrol could have sat in the office of the Vice-Admiral at Dover on a pitch-dark night with the lights out, and the window open, waiting for the sound of gun-fire or the reports of gun-fire from any of the many stations between Beachy Head, Dunkirk, or the North Foreland. In conversation they would have learnt the small number of our protecting destroyers, the different places where the enemy might turn up, and the exact position every quarter of an hour of our own vessels, the real points the Vice-Admiral had to defend, those places perforce left undefended, as well as the chances against the enemy being brought to action, and his clear knowledge that, if the probable happened, a howl would be raised in some newspapers next day, and questions be asked in Parliament as to what the Admiral at Dover was doing.

To that no satisfactory answer could, of course, be given because to do so would have been to expose the inadequacy of our force available for defence. Such persons, hasty and ill-informed, if well-intentioned, would then, perhaps, have grasped that the best way to help their country during war, was not by ignorant criticism of every untoward event, but by leaving censure or blame to the responsible authorities. They

might further have guessed that, although the Admiral probably laughed, and said that he did not "care a damn" for the Press or Parliament, the prospect of the next day's comments did not help him to bear his heavy load of responsibility, especially as he knew that such comments would infallibly undermine his reputation with the nation, and most certainly not increase the confidence in him of such of his officers and men who were ignorant of the true conditions underlying the work of the Destroyer Patrol, for only the Admiral had all the cards exposed and knew the weakness of his hand.

On October 26th, 1916, information was received from our air reconnaissance that considerable train activity and movement of barges were noticeable in Ostend. Armed barges had also been seen in the canals, as well as the presence in the harbour of additional destroyers. These additional destroyers at Ostend, combined with the discovery of armed barges in the canals and abnormal train activity at Ostend, made me more anxious regarding an attack on that portion of the Belgian coast occupied by us than one in the Channel. Additional German destroyers had previously been sent to Ostend, and were used to try to catch our patrol in the early morning, and to force our vessels from the patrol line, in which attempt they were unsuccessful; while, on other occasions, their presence appeared to be due to escort duties. Hitherto they had never attempted to pass the mine-field or approach the Straits. Moreover, there had been no night transport of our troops for some months—a fact of which I imagined the enemy had complete knowledge, so that no useful military purpose would apparently be served by their entering the Straits.

The Downs, however, was always a weak spot. The two places, therefore, which I considered required the most safeguarding on the night of October 26th–27th were the Belgian coast and the Downs.

The destroyer force at my disposal was one division of

eight boats lent from Harwich for work with the Belgian coast barrage, three 4-inch Tribals, three 12-pounder Tribals, eight 30-knotters, four P-boats, and two torpedo-boats. These I disposed as follows: one-half division of Harwich boats in the Downs; one-half division of Harwich boats and four 30-knotters at Dunkirk; one monitor and French T.B. at La Panne to cover the beach to the eastward; the Tribals (with exception of the *Zulu*, which was on the Beachy Head Patrol), in Dover, with steam at ten minutes' notice.

The Tribals, assisted by 30-knotters and P-boats, had daily to undertake the whole of the patrols, and the usual escort work in the Straits. Latterly, owing to the presence of submarine boats to the westward, I had been obliged to strengthen the traffic patrols in the day-time and double the escorts; so that the Tribals were out on duty every day, and had to rest in Dover for the night.

The patrol for the night placed the *Flirt*, a 30-knotter, with the drifters, in the eastern area of the Channel, as an assistance to them should a submarine be sighted or get into the moored nets. No attempt was made to provide for a defence of the Straits against a raid, nor could such defence be attempted with the vessels I had then at my disposal, as reasonable rest and sleep had to be allowed to the officers and men. To defend the Straits against a raid, a considerable number more destroyers than the raiding force could bring would have had to be kept continually at sea in order to cover successfully the area of approach and to be in reasonable force at any point where the enemy might turn up. Of course these numbers were not available.

Four divisions of drifters were patrolling the net-line between the Goodwin and the Ruytingen Buoy. The yacht *Ombra* and the trawler *H. E. Stroud*, wireless vessels, were attending on them.

It is always difficult to piece together the true facts of a night raid; but, so far as could be gathered, the enemy sent

two divisions of six boats each. They arrived round the east-end of the net barrage—which then only extended to the Ruytingen—and divided, one lot steaming for Grisnez, and the other for Dover. The latter boats were sighted by the destroyer *Flirt*, who at first took them in the darkness for our Dunkirk boats returning to Dover. She did not appreciate that movements of this nature by destroyers at night rarely took place near the patrol line in the Channel, and that, if they had to be made, the patrols were warned that such a movement was about to take place.

Soon afterwards the *Flirt* heard gun-firing, and proceeded in the direction of the flashes. At Dover the firing was also heard, and I ordered out the Tribals which were resting, told the boats in the Downs to weigh, so as to be ready to meet an attack on the shipping, and also warned the Commodore at Dunkirk. But I did not move the Dunkirk Division until I was certain that the French coast was not the real object of attack, and that the Channel business was not merely a diversion.

The *Flirt* soon met men floating in the water, and stopped to pick them up, putting on her searchlight to do so. The first lieutenant and another hand went away in her boat to pick the men up and found they were part of the crew of a drifter. As soon as the *Flirt's* searchlight showed up, she was attacked by two enemy destroyers, who sank her. Not one soul—except those in the boat picking up the drifter's crew—was saved and, strange to relate, no flotsam from the wreck was ever afterwards seen. The enemy destroyers sank six drifters and damaged three others and one trawler. Forty-five officers and men were killed, four were recovered wounded, and one officer and nine men were taken prisoners by the Germans. Soon the Dover Tribals arrived, among which were the *Amazon*, Lieutenant Guy Warren, the *Nubian*, Commander Montague Bernard; and the German boats made off. Meanwhile the enemy division that had steered for Grisnez struck up the Folkestone-Boulogne transport

route, and overhauled and sank by gun-fire the *Queen*, an empty transport, first boarding and taking away her papers.

As all was quiet on the French north coast, I called the Dunkirk Division to the Channel to try and cut off the raiders; but, as our boats had nearly one hour's steaming to do before they could reach the scene of action, they were too late to be of any service. The *Amazon* was considerably damaged by shell-fire, and the *Nubian* had her forepart almost severed by the explosion of a torpedo.

Exactly what damage was done to the enemy it is difficult to say. At first the reports received led me to believe that two of them had been blown up on crossing the net line, as the times of reported explosions varied considerably from that of the torpedo that struck the *Nubian*, nor was it probable that gun-reports would be mistaken for submerged explosions; but no confirmatory evidence was subsequently received. I much regretted the loss of the gallant drifter crews'.

The loss of the *Queen* was unfortunate, and she could easily have been salvaged, if all the reports received from her crew had not definitely stated that she "had been sunk" by gun-fire, whereas, as a matter of fact, she did not sink until she had drifted up near the South Goodwin, some three hours afterwards. It was, however, a matter for satisfaction that the possibility of such a night-raid had been foreseen, and that I had abolished all night-sailings of troops. Had the night-sailings been in force a disaster of some magnitude might have resulted.

On the drifters fell the bulk of the attack, and they of course were merely unarmed patrols, unable to defend themselves. It might, perhaps, have been expected that after this occurrence they would have been a bit shy of their night-patrols, but they were quite unaffected. In fact, a report having got about that they did not relish watching their nets at night, the skippers went in a body to the Captain of the Drifter Patrol, and said that, so far from not liking to do

night-patrols, they were ready, should I wish it, to lay their nets and watch them off Zeebrugge. Their pluck was always magnificent—for, mind you, there is a vast difference in patrolling in a vessel that can answer an attack reasonably, and one provided with one rifle and a few rounds of ammunition—all the defence that they had.

The net result of the raid was to cause an increased destroyer force to be sent to Dover, several of the Phoenix class being attached to the Patrol, and a corresponding number of the Harwich force withdrawn. The following memorandum was issued to the Patrol on the subject of this raid :

“ A raid is always difficult to deal with, even when it is known to be coming off. Any one can run round a corner and throw a stone, and then make off. It is merely a question of whether the damage of a broken window is worth the risk of being caught by a policeman, especially if the window is open and the glass cannot be broken.

“ We have had in the Patrol to take many chances. The extent of our area is large, the vessels necessarily comparatively few. We have varied classes of offensives to deal with, and each offensive requires a different class of vessel and a different disposition to deal with it. It is pleasing to see that our defence against submarines has led the Germans into the far more risky method of attack by destroyers.

“ The raid of the night of October 26th may be taken as a compliment by all engaged on the Belgian Coast Patrol, and the protection of the Channel against submarine boats.

“ For five months after the barrage on the Belgian coast was placed, not one single new mine was laid in the English area ; one new lot of three mines has since been laid. It is small wonder that the Germans are stung by our cross-Channel transport service continuing to run to schedule times.

“ The new form of attack is quite innocuous, as I do not run full transports at night ; but it is dangerous to our traffic areas, since any day the Germans may once more run amok, and sink vessels at sight without warning. The most serious part of the late raid is that the Germans are at last beginning

to use their destroyers properly. With such use, they will discover their power, and we shall have far more difficult times than heretofore."

The *Nubian* was taken in tow and brought close to the eastern entrance of Dover. But, meanwhile, it had come on to blow from the south-west, the tow-ropes unfortunately parted, and the *Nubian* went on the shoal chalk reef stretching out from the South Foreland. Here she left her bow behind, and at high water the remainder of the vessel was driven close up under the cliff. In this position (see Plate LXIII) she rode out two gales of wind, but eventually was brought into Dover. The *Zulu* about this time had been mined and had lost her stern. The bow of the *Zulu* was joined to the stern of the *Nubian*, and a sound destroyer, christened the *Zubian*, resulted.

The next raid was on November 23rd, when six enemy boats were seen near the Downs. At 10.45 p.m. the German flotilla tried to pass inside the south entrance of the Downs. These destroyers, each armed with three 4-inch guns, opened fire on the night patrol of the Ramsgate drifters, each armed with a 6-pounder.¹ The drifters returned the fire, and the destroyers made off. The drifter *Acceptable* was hit; as was invariably the case, the drifters did not hesitate to stand up to the enemy destroyers, in spite of the futility of their armament. Our destroyers had not time to get to the spot, so hurriedly did the enemy run from our little drifters. The German official version is worth quoting to show how they reported an action so absolutely inglorious to them as a naval power.

"Parts of our naval forces made a reconnoitring expedition in the night between November 23rd and 24th to the estuary of the Thames and the Downs. Apart from an outpost ship, which was sunk, no hostile naval forces were seen. The fortified base of Ramsgate was bombarded by German

¹ The Ramsgate drifters were armed with a 6-pounder merely to enforce traffic regulation.

artillery, but when no English fleet was still visible, our fleet returned to its base, where it arrived safely."

Ramsgate was not bombarded; no vessel was sunk; and six large destroyers ran away from six little fishing-boats—and the destroyers, which they momentarily expected would be down upon them!

The next adventure of the German destroyers was on March 1st, 1917, when the destroyer *Laverock*, on patrol in the Channel, was hit by a torpedo that did not explode, while a second division of enemy boats made an attack on Broadstairs. The following report, made at the time, gives a general account of the raid:

"From the evidence I judge that two separate attacks were carried out; one, by probably five boats, on H.M.S. *Laverock*, and the other, by three boats, on Broadstairs—making eight boats in all. My reasons are:

"(a) Only three boats were seen by drifters near the North Foreland.

"(b) Four, or more than four, by the *Laverock*.

"(c) The distance, twenty-five miles, between four miles S.W. of No. 11 Buoy and E. by N., three miles from the North Foreland, could not have been covered against the tide in forty minutes (*i.e.* thirty minutes actually reported, and ten minutes for difference in watches). The boats could not have passed close to the Goodwins, or the drifters near No. 2 Elbow Buoy would have seen them.

"(d) The *Lochinvar*—one and a half miles S.W. of No. 9A Buoy—saw no destroyers: she would have been dead in their path if they had steered straight from the *Laverock* to Elbow Buoy.

"It is probable, therefore, that the boats that attacked H.M.S. *Laverock* turned sixteen points, and returned by the route that they came.

"The destroyers were sighted steering south-west. I consider that the most reasonable explanation of the raid was that the enemy wished to pass through submarine boats to lay mines. Mines were laid that night at Folkestone Gate,

Dungeness, and at the *Royal Sovereign* and *Owers* light vessels. In addition, they may have tried to get behind our patrol line to rush the Downs from the south end. Otherwise I do not see what they were doing so far to the south of the barrage, steering south-west.¹ There is the chance that they wished to cross the Dover-Calais line merely to say they had done so; but as they made this claim in their *communiqué* when they had not done so, there is no apparent reason for having seriously attempted it on this occasion. It is possible that they passed through the South Goodwin-Snou Bank Barrage at the point where No. 9B Buoy should be (the buoy is missing). They did not come through to the east of No. 16A Buoy, as we had drifters there, which must have seen them. This looks as if they had surveyed the barrage with aircraft, and noted this gap.

"On discovering H.M.S. *Laverock*, they fired two torpedoes at least. One passed clear; the other, it has since been found, hit her in the fresh-water tank, but did not explode. They fired H.E. shell with time-fuses, which completely blinded the officers on the bridge; they did not attempt to follow the *Laverock*, but made off at once. It is not at all impossible that they hoped to rush the south end of the Downs behind our patrol, and get our destroyers in the Downs between their two lots of boats, as this raiding division would have been close to the *Gull* lightship at the time the northern boats opened fire on Broadstairs.

"The commanding officer of H.M.S. *Laverock* did all that could be expected of him: he shook off his assailants, and then tried to follow them and find out where they were steering for.

"With regard to the attack on Broadstairs, the destroyers in the Downs slipped and arrived at the Elbow Buoy—a distance of twelve miles—half an hour after the first gun had been fired. I do not like to anchor these boats at night near Ramsgate, since having to anchor outside shoal water, they would be very open to submarine boat attack on the surface at night.

"This attack differed from those previously made in that

¹ It is not unlikely that these boats again penetrated to, and swept up the Folkestone-Boulogne troop transport line, but of course found nothing there.

it took place three hours before high water; usually they have been within an hour each side of high water. This will in future entail longer hours for special patrol vessels.

"When H.M.S. *Marshal Ney* is completed,¹ she will cover Ramsgate to a great extent, and be of value in defending the shipping in the Downs; but bombardment of Margate will still be possible. Extinguishing the Elbow Light Buoy would be an advantage, but would not necessarily prevent raids, as the Foreland can be 'made' even on a dark night at high water without danger.

"I would suggest that it might be possible to lay moored nets between the Elbow Light Buoy and Kentish Knock—a distance of twelve miles only, in line, or nearly in line with the main run of the tide. As all traffic comes from the Edinburgh Channel now, and does not run at night, it would be possible to pass the traffic inside these nets in day-time. If we can lay the nets and ensure the heads floating in the tide, they would be a great danger to destroyers, and should also stop submarines. Surface buoys would not be required. This area is outside my command, but I could undertake half the distance, if required, to relieve the work of the Commander-in-Chief, The Nore. I have found the nets between Elbow Buoy and North Goodwin easy to maintain, as the water is shallow and the tides comparatively weak. A small ship blew in her bows on them a few days ago.

"As our Channel Barrage becomes reinforced by the intermediate buoys, I hope that it will prove also a deterrent to destroyers; but it is difficult to keep the head of the net up to the surface in the cross-tide, when it is making strongly. I hope, however, to get eventually some form of surface mine.

"I think it may be fairly claimed that the destroyer raid was foiled in its purpose, unless that purpose was to pass through submarines, and if it has been found necessary by the enemy to use destroyers to pass submarines, it is a compliment to the Patrol and the Barrage."

On March 23rd a third attempt was made on the Channel Patrol Line near Calais and about two hours after a lightning

¹ The *Marshal Ney* was being fitted with 6-inch guns for the defence of the Downs.

bombardment of Ramsgate. My report at the time was as follows :

" At 10.50 p.m. on the 17th inst., H.M.S. *Paragon* was torpedoed.

" The evidence of the survivors shows :

" (a) That the *Paragon* was hit by a torpedo while challenging.

" (b) The enemy fired a few rounds.

" (c) The *Paragon* returned the fire and fired a torpedo.

" (d) The *Paragon* sank in eight to nine minutes.

" The question whether one or two torpedoes struck the *Paragon* is uncertain. A survivor states two struck her, but no observer outside the *Paragon* saw more than one explosion. If two struck the ship, they must have hit her practically simultaneously. One torpedo exploding at the foremost engine-room bulkhead would probably have sunk the vessel.

" H.M.S. *Laforey* arrived on the scene about ten minutes after, and burned her searchlight to pick up survivors. H.M.S. *Llewellyn* arrived shortly after—the time cannot be definitely ascertained—and switched on her searchlight.

" At about 11.15 p.m. the *Llewellyn* was torpedoed, presumably by the same destroyers, although a submarine may have accompanied the destroyers and remained near by. An examination of the *Paragon's* torpedo, which has been recovered, shows that the torpedo ran, and that there was no damage to the air-chamber flange beyond a slight burr ; no further damage was discovered. It is possible that the torpedo struck a glancing blow which knocked off the head, but did not actuate the pistol.

" The *Llewellyn* at 10.51 p.m. (received at 11.2 p.m.) reported heavy firing in the direction of Calais. Calais reported firing ceased at 11 p.m. At 11.13 p.m. a signal from the *Laforey* was received that she was picking up survivors. All reserve boats in Dover were ordered to slip.

" At 11.28 p.m. a signal was received from the *Laforey* that the *Paragon* and *Llewellyn* had been torpedoed, and that she was picking up survivors. At 11.40 p.m. this was corrected to read ' Sunk by submarine.' It seemed from this as if a submarine was stalking the boats on patrol.

" At 11.40 p.m. I therefore stopped the reserve boats from

Dover and told them to return, and ordered out *P. 21* and *P. 11* to hunt for the submarine in the eastern part of the patrol line, and at 11.50 p.m. ordered the destroyers on the patrol line to fall back five miles to the westward of the normal line and patrol at good speed. It was not till 12.20 a.m. that I received a signal that the *Llewellyn* was not sunk, and that she and the *Laforey* had only two of the *Paragon's* survivors on board. I therefore, at 12.30, ordered out six motor-launches to look for survivors. The *Llewellyn's* position was asked for and a tug was sent to her assistance.

"At 1.7 a.m. I received a signal to say that survivors of the *Paragon* report that 'they saw enemy's destroyers.'

"This quite altered the situation. I therefore at once stopped the *P.* boats going to the barrage, since, though suitable for hunting submarines, they were quite unable to deal with destroyers. Sent *P. 11* to relieve the *Laertes*, which was escorting the *Llewellyn*, and recalled *P. 24* to harbour. At the same time I sent the *Myngs* and *Lark* to reinforce the destroyers on patrol.¹ The *Llewellyn* arrived at Dover at 4.30 a.m.

"In the meantime, at 12.44 a.m., Leathercoats Signal Station reported heavy gun-fire in a N.E. direction and Ramsgate in an easterly direction. At 12.47 a.m. *T.B. 24* reported enemy's destroyers bombarding Margate. The *Canterbury* in the Downs reported at 0.41 a.m. that she was proceeding with Downs destroyers. The *Riviera* reported that she had sent up a sea-plane at 0.51 a.m.; and at 1.08 a.m. *T.B. 4* reported enemy's ships being engaged to northward. At 1.45 a.m. the *Canterbury* reported that she was returning with destroyers to the Small Downs.

"It appears that three or four enemy destroyers approached the North Foreland from the N.E., passed close to the s.s. *Greypoint*, and torpedoed her, turned to the westward and fired shell at our drifters and at Ramsgate, turned to the N.E., close past the s.s. *Greypoint* again, and steamed away to the N.E. *T.B. 4*, in reporting the boats being fired at from northward, was evidently mistaken.

"The damage done ashore was slight; three houses were

¹ An excellent example of how inaccurate wording of reports by signal may cause totally wrong dispositions to be made.

hit, but no casualties. The drifter *Paramount* was hit in several places, and I regret to say the skipper and two hands were severely injured. The s.s. *Greyhound* should not have been at anchor in the North Downs. She had started for the Thames, but her engines had broken down, and she was unable to proceed. I have instructed the Senior Naval Officer, Ramsgate, in similar cases, to tow the vessels to a safe anchorage before dark.¹

"The raids on the Dover Patrol Line are most difficult to deal with, and for clearness I sum up the situation in the following sentences :

"(a) *As regards the Barrage Attack.*

"The enemy need only keep a rigid look-out when close to the Straits for one hour on a definite night, and fire a torpedo at anything he sees and run away. Our boats have, night after night, to keep a look-out for the whole night, and we are never immediately absolutely certain whether vessels seen are enemies or friends. The look-out kept must be, for physical reasons, inferior to that of the enemy.

"The enemy can vary the time of attack at will, and choose his night. He can predetermine whether to 'shoot and scoot,' or to carry out a more or less prolonged attack. The best disposition of my destroyers differs in each of these two forms of attack.

"I must cover the whole breadth of the Straits. The enemy can attack at a point.

"I must rest my boats' crews, officers and men, and therefore can only keep a proportion under way, and he can rest his crews every night except the one he may choose for an attack in force. We have to be prepared every night, not only for destroyers, but to look out for submarines and raiders, and other vessels trying to pass through the Straits.

"(b) *As regards the Raids on the Coast.*

"The enemy can choose the night and time, and which part of the coast he wishes to attack. My main preoccupation is to cover and protect the shipping in the Downs.

"The enemy can attack from the north or south, or, at certain states of the tides, cross the Goodwins, or shell the

¹ The *Greyhound* was the only merchant vessel sunk or hit by German destroyers in their raids in the Channel and Downs.

shipping from the eastward of the Goodwin Sands. I must therefore, keep my vessels near the shipping so as to be in a position to deal with any of these forms of attack. My vessels are resting, so-called, after day-work; therefore they must anchor.

"The shore raids are comparatively harmless, and, therefore, the protection of the shipping, which is the more important of the possible objectives, must receive first consideration.

"The obvious lessons of this raid, which I have pointed out to the boats, are :

"The frequent changing of look-outs, every quarter of an hour, if possible.

"To lower boats to pick up survivors and to keep under way clear of the spot and not to burn searchlights, except in cases of absolute necessity. The use of star-rockets is preferable.

"I have made alterations in the method of patrol of which I have informed their Lordships verbally.

"The mounting of guns on the North Foreland and Foreness and the arrival of the *Marshal Ney* should considerably ease the situation in the North Downs.

"The problem is a difficult one owing to every point being in the enemy's favour in this class of 'shoot and scoot' warfare; but I am very hopeful that we may yet give him a lesson, and one serious blow will, without doubt, make him less eager to carry out these raids."

The last paragraph of the above was prophetic, for the next raid proved to be the last the enemy made during the tenure of my command, as his raiding destroyers were this time—April 20th to 21st—engaged by the large destroyer leaders *Swift* and *Broke*.

My report at the time stated :

"It is difficult to disentangle the true facts of this raid on the Channel. On the night of April 20th–21st, from a general review of all the evidence, I believe that a division of six enemy boats took part. Two boats went to Calais and four off the *Maloja* wreck vessel.¹ The firing at Calais commenced

¹ The distance separating these two points is twenty miles.

about 11.10 p.m., and lasted seven to eight minutes. The firing at *Maloja* began at 11.30 p.m., and lasted about the same time. The trawler *Sabreur* was fired on and hit; one man was wounded and a considerable number of shells were fired blindly into the county of Kent. The destroyers left the *Maloja* position, then steamed N.E. by E. to No. 3A Buoy, while the *Swift* and *Broke* were at the east end of their line, and back on a S.W. course, missing them again. They probably rendezvoused the Calais boats at No. 3A Buoy about 0.45 a.m.

"At 0.50 a.m. they steamed about E.S.E. to return and this time passed close to the *Swift* and *Broke* on the West Patrol, port side to port side, on nearly opposite courses. The *Swift* put her helm hard-a-starboard, and increased to full speed; the *Broke* did the same. The *Swift* passed through or behind the line—probably through—between G. 85 and G. 42—two of the enemy boats—failing to ram, partly because the captain was affected by the blinding effect of the foremost gun. He fired a torpedo, which probably hit G. 85 on the starboard quarter. The *Broke* fired also at G. 85, and either hit her with her torpedo or mistook the explosion of the *Swift's* torpedo (if this was the torpedo that hit) for her torpedo. The *Broke* then rammed G. 42. After this the *Swift* followed the retreating boats without sufficiently damaging any to cause them to drop in speed. The *Broke* came under the fire of another destroyer and suffered considerable damage from her gun-fire. The *Broke* claims to have torpedoed this destroyer also. After this, the *Broke's* engines were out of action.

"I can obtain no evidence of the loss of a third boat, except the statement that the second torpedo of the *Broke* was seen to hit. No prisoners were secured from the third boat; three boats were never seen disabled at one time, and the Germans named correctly the two boats from which we had survivors. To name two boats only, if three had been sunk, would have been difficult. For these reasons, I consider that two boats only can be claimed, although undoubtedly others were damaged by gun-fire.

"The captains of the *Swift* and *Broke*, Commanders Am-

¹ This was probably incorrect, see page 354.

brose Peck and E. R. G. Evans, both distinguished themselves by immediately adopting the correct tactics of using, or trying to use, the ram and torpedo. The difficulties of so doing on a dark night, with gun-flashes to blind, is great, especially as the difference between being the rammer or the rammed is merely a small difference in judgment. It is most satisfactory to note that all the officers and men are praised by their respective captains. I had to reduce the list sent in by the captains of officers and men recommended, as they embraced all the officers and a large proportion of the total complement of the vessels. Not only did the officers and men fulfil their assigned duties, but, as emergencies arose, the officers, as might be expected, and the men rose to the occasion and reorganised and supplemented deficiencies.

"Commanders Peck and Evans were promoted to Post-Captains and awarded the D.S.O. for their gallant conduct on this occasion. The conduct of Mr. Donald A. Gyles, Midshipman, R.N.R., of H.M.S. *Broke*, and Sidney Clarke, Able Seaman, O.N., J. 5,244, Herbert T. H. Fowler, Ordinary Seaman, ON.SS. 7,516, William G. Rowles, Able Seaman, ON. 201,767, Leonard Robinson, Able Seaman, ON.SS. 5,060, all of H.M.S. *Broke*, who continued at their duty in spite of wounds, is worthy of special commendation.

"This affair, from the point of view of the protection of the Straits of Dover, presents several points of interest. Whether the enemy did, or did not, stumble on our patrol was a pure matter of luck. If they had not done so the bombardment of Calais and Dover would have produced a howl from the public, which would have been out of all proportion to the damage done, or the way our material interests in these waters had been safeguarded.

"Changing the entire disposition of the patrol after dark undoubtedly kept the enemy ignorant that we had a western patrol.

"The Germans have used their boats to feed an ignorant public on inaccurate accounts of futile operations. Their vessels have been assigned operations which are against sound principles; hence, they have been taught wrong tactics. The main tactic of a futile raid is to run away, so as not to be caught; hence, their boats have learned to run and not

to fight, with a result that six of their boats ran from two of ours. This is bound to undermine the morale of the enemy, and at the same time increase the confidence of our officers and men to a degree that will admit of no defeat in any fight.

"I much regret the losses which our boats suffered, but they are, I am glad to say, slight in comparison with the result obtained. I have already forwarded a list of officers and men whom I desire specially to recommend for their conduct in this engagement. Lieutenant-Commander Arthur J. Landon, R.N., of H.M.S. *Mentor*, deserves commendation for immediately taking his division (in reserve) to the position of the gun-fire. Had the enemy fought the action out, he would have been in a position to render material assistance.

"The necessity for the bridges of all 4-inch torpedo-boat destroyers being arranged so as to shield the captains from the flash of the foremost gun is most clearly brought out. I have directed that arrangements for doing this are to be immediately tried in each class of boat, with a view to my being able, at an early date, to forward recommendations on the subject."

This report was written immediately after the action, and it was not until some days after that careful study explained exactly what had happened.

The diagram on the following page shows that the *Swift* and *Broke* were in line ahead when they sighted the German division, port side to port side. The *Swift* at once starboarded and the *Broke* followed; both fired their port torpedoes at G. 85, and at least one took effect. The *Swift* fired the 6-inch gun which had been mounted on her fo'cs'le, and her captain and all on the bridge were blinded. She, therefore, lost sight of the enemy for several seconds, and passed astern of G. 42, which was the last boat of the line. Immediately she saw her on her port side, she starboarded and came up on the starboard quarter of the German destroyers and chased them, keeping up a running fight until, badly holed in the bow, she took in so much water that her speed was hopelessly reduced. The *Broke* in the meantime, after

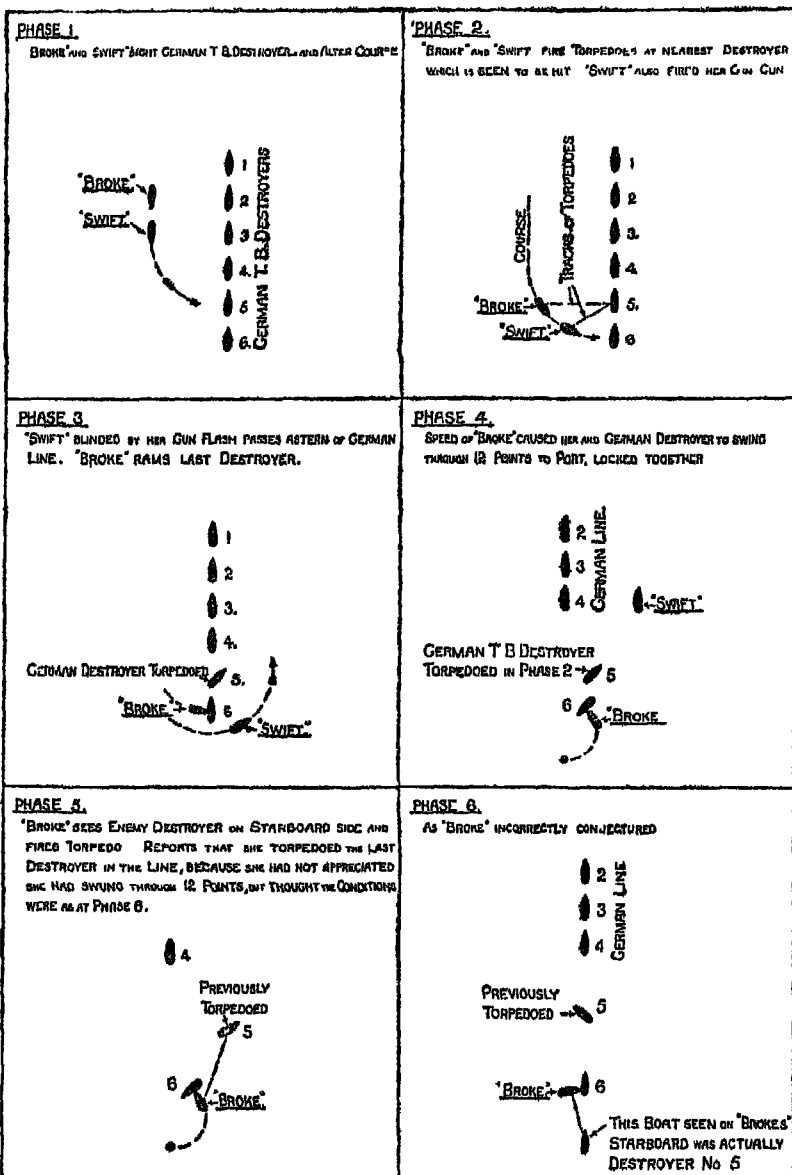


DIAGRAM ILLUSTRATING ACTION BETWEEN H.M.S. "SWIFT" AND
H.M.S. "BROKE" AND GERMAN DESTROYERS

firing her torpedo, saw *G. 42* on her starboard bow, and starboarded ¹ and rammed her abaft the after-funnel. Now the effect of the 30-knot speed of *G. 42* and a similar speed on the *Broke* crashing in aft was for the two destroyers to swing violently to port, probably nearly through sixteen points. This was not appreciated by the *Broke's* officers, who had plenty to think about in their engagement with the German destroyer. The next thing Commander Evans saw was a destroyer on his starboard side—this really was *G. 85*, which had been already torpedoed. But not appreciating, during this lightning action at high speed, that his boat had swung nearly sixteen points to port, he thought it was another boat astern of the one he had rammed, and fired another torpedo, and hit the same boat a second time.

This led to three boats being claimed; the one originally torpedoed on his port side, the boat he rammed, and the boat he torpedoed on his starboard side; whereas the one torpedoed on his port side and afterwards on his starboard side were one and the same boat.

Attention was now directed to capturing the boat rammed and securing prisoners. Then, getting clear of *G. 42*, which soon after sank, the *Broke* approached *G. 85*, on the fo'cs'le of which one or more men cried "Kamerad," but the after 4-inch gun still continued to fire at the *Broke*. A third torpedo sank her.

This point of surrender at night is an interesting one. In day-time the official signal of surrender is to haul down the ensign, and this practically is an order to be obeyed by the crew. Individual surrenders are quite properly ignored so long as the ensign is flying. At night-time there is no official signal of surrender; no individual surrenders should be paid attention to until the senior officer notifies he has surrendered. Calling out "Kamerad" on the fo'cs'le, was not treachery—it was the surrender of individuals. The after part, which is

¹ "Starboarded" is, of course, correct on account of the speed of the enemy's destroyers.

the quarter-deck, never surrendered, but G. 85 went down still firing her after 4-inch gun in a gallant manner, and deserves to be honoured for so ending her career. Both the *Broke* and *Swift* sustained considerable damage; the casualties were not as many as might have been anticipated.

In the published announcement I remarked that "fortunately" we were able to save the lives of many of the Germans. It is almost incredible how that word "fortunately," emphasised by the indefatigable exertions of certain newspapers, was at once seized upon by people all over England, who took the opportunity of writing me vituperative letters, both signed and anonymous; and women especially displayed a vindictiveness that was next door to fiendish. It was remarkable how one and all looked on the sinking of the *Lusitania* by a submarine as precluding all possibility of recognising bravery in a destroyer action.

In writing that press notice, I inserted "fortunately" on purpose, and am glad I did so, in spite of the personal inconvenience it afterwards caused me. I was anxious to convey to the Patrol my approbation of their having fought honourably and as gentlemen, as the Navy always has fought, and of their having tried, after the action, in accordance with old navy tradition, to save as many of the foes as possible.¹ A spirit of savagery was much to be deprecated, and tendencies in that direction were rather stimulated by current publications. A memorandum to the Patrol on the subject was needless, and might have been looked on as almost insulting. Again, the more prisoners taken the better the chance of getting information, and checking the information given by the various witnesses. Much that was of value was elicited from the survivors. I repeat that we were indeed "fortunate," for both the above reasons, in saving a considerable number of the Germans.

¹ I hate quoting Nelson in 1798 for an action in 1917; but in a case of naval ethics his example is to be prized. One of his chief preoccupations in the battle of the Nile after the *Orient* caught fire, was to send away boats to save her crew.

Another matter which added fuel to the fire of recrimination was my sending a wreath to the funeral of the German officer buried at Dover, with an inscription "to a brave enemy," which was expanded by some of the daily newspapers into "brave and gallant enemy." The reason for this act, which certainly was not a customary one, was as follows. A few months previously one of our airmen of the Dover Command—a gallant boy—had been killed over Ostend. Shortly after a German aeroplane dropped on the Dunkirk aerodrome a parcel containing a few trifles found on him, a piece of the ribbon of a wreath placed on his grave, and a photograph of his funeral and grave to be sent to his relations. This was a graceful act, and at the time I determined that the next German officer buried in my command should have a wreath also to show that, in honouring the dead, we were not behind the Germans. The next happened to be one of the officers of the G. 85, and he had his wreath. Plates LXIV and LXV may be of interest, being copies of the two photographs that the Germans dropped.

The general principles that I followed in arranging our dark period patrols in the Channel during the remainder of 1917, were to have the destroyers patrolling in units of four boats, and the destroyer leaders in a unit of two or three vessels; to have these units patrolling on lines to cover, with as short a steaming distance as possible, the points the enemy were likely to make for in starting their lightning bombardments; and at the same time to arrange that one end of each of the lines that were being patrolled should be within sight of some navigational light, so that the position of the boats could be frequently checked; that the turn at each end was made at definite times, so that I knew by a glance at the clock, at any moment, the position of each patrol; and, lastly, that where independent patrol lines approached even moderately near to each other, the times of turning were arranged so that the two patrols were at the eastern or western ends of their patrol lines simultaneously, and therefore throughout the

night could never accidentally approach each other. By this means the areas were covered in the most economical manner, and without any possibility of friendly patrols sighting each other. Each patrol, therefore, had orders to attack, torpedo, and sink any destroyers sighted, without compunction or the doubt and loss of time always incurred by challenging, a fundamentally important point emphasised by many untoward experiences.

On April 27th Ramsgate was shelled by enemy destroyers. Two civilians, unfortunately, were killed and three were wounded. The *Marshal Ney* and the 6-inch batteries at Foreness and North Foreland that had been lately erected, and the extension of the North Goodwin nets, stopped all further raids in 1917.

The Tribals of the 6th Flotilla lost, during 1915-17, *half* their number owing to mines or torpedoes. The first to be mined was the *Maori*, Lieutenant-Commander B. W. Barrow, off Zeebrugge. The Admiralty, in April 1915, wished certain moored nets off Ostend looked up. I sent two destroyers, the *Maori* and *Crusader*, and told the captain of the *Maori*, after doing the work, to approach Zeebrugge and sketch the salient marks ashore to assist me in our first bombardment, for which preparations were then being made. He was not to go within 10,000 yards of the shore. I had only been two or three weeks in command at Dover, and my experience of the Belgian coast was *nil*. Six months later the *Maori* would not have been lost. I would have arranged her visit so as to be off Zeebrugge at high water. As it was, I did not appreciate the importance of such a detail; she struck a mine and sank, and her crew were all taken prisoners. It was unfortunate that they were not picked up by the *Crusader*, but the strict Admiralty injunction not to risk a second vessel in the vicinity of one mined no doubt exercised considerable influence on the decision of her captain. But still, occasions do arise when decisions may have to be taken against the strict letter of an order, and generally a solution may be found

which accords with time-honoured traditions of the Navy. I much regretted the loss of the services of Lieutenant-Commander Barrow, who was a most able destroyer officer.

The next destroyer to be mined was the *Mohawk*, and she was blown up, as bad luck would have it, in the very first mine-field laid by German submarines in the Channel. In the early morning, while patrolling near the N.W. end of the net area, some mines were seen close to her; her helm was put over to clear them, but a strong east-going tide swept her over them. She was towed into Dover with her upper deck almost level with the water.

The *Viking* was mined in a known dangerous area not far from Boulogne. Instead of the dangerous area having been accurately marked by a circle on her chart, a general pencil notation "mines" was written. This emphasises how necessary it is to exercise extreme care on all occasions. It is the old tale of familiarity breeding want of care.

One peculiar point about the occurrence was that the after oil-tank caught fire and sent up a great column of smoke. It appeared as if the whole boat must inevitably be consumed by fire. However, as soon as she was taken in tow the fire went out, the reason being that the smoke was caused by a burning patch of oil harboured in the wreckage, which patch was continually being fed by fresh oil bubbling up. As soon as motion was got on to the vessel, this burning patch was washed out, and nothing remained to ignite the oil coming to the surface. On boarding her I found that her after magazine had exploded and her decks were nearly red-hot aft. This was a sad accident. All the officers except the gunner were killed; they had gone below to lunch just prior to starting the afternoon escort. Commander Williams, a most efficient officer, had been in the Patrol during the whole war, and had taken over command of the *Viking* only a short time before. Sub-Lieutenants Houth and the Hon. Harold C. Tennyson were both promising officers. Plate LXII gives a striking view of the effect of the explosion in the *Viking*—literally her stern



H M S " VIKING " AFTER BRING INJURED

The result was as if she had been gripped and crushed through by a giant hand



THE OFF-REPORTED PERISCOPE.
 PLATE LXI.
 The fit of the thrasher shirt.
 3603



A FRENCH TORPEDO-BOAT AFTER BEING MINED.

was connected to the fore-part by her propeller shafts only. It was just as if a giant had seized her round the ward-room and scrunched her through in his grip.

The *Nubian* was torpedoed in the raid of October 26th, 1916. The torpedo exploded almost under her bridge, but most fortunately did not kill the occupants, although the personnel in the foremost stoke-hold and on the fo'cs'le suffered severely.

The *Zulu* was mined on November 8th, 1916, while on passage from Dover to Dunkirk. The mine exploded under the engine-room, throwing parts of the turbines on to the fo'cs'le. There was a fair sea on, and the motion caused the after-part to break off and sink. The fore-part was towed into Calais by the French T.B.D. *Capitaine Mehl*, only just in time to save it from sinking. Curiously enough, the captain was telling one of his officers, within half a minute of the explosion, how the ship's black cat had deserted the day before!

The *Ghurka* was mined off Dungeness on the night of February 8th, 1917. Practically all hands were lost, as it was blowing the best part of a gale of wind. Lieutenant-Commander Woolcombe Boyce, her captain, had been in the Patrol throughout the war, and was a sad loss to the flotilla. Commander Lewin, my Gunnery Commander, was spending the night on board her to inspect her gunnery arrangements at night. He was saved, and was instrumental in saving the life of one other man, for which he received the Stanhope and the Humane Society's Medals.

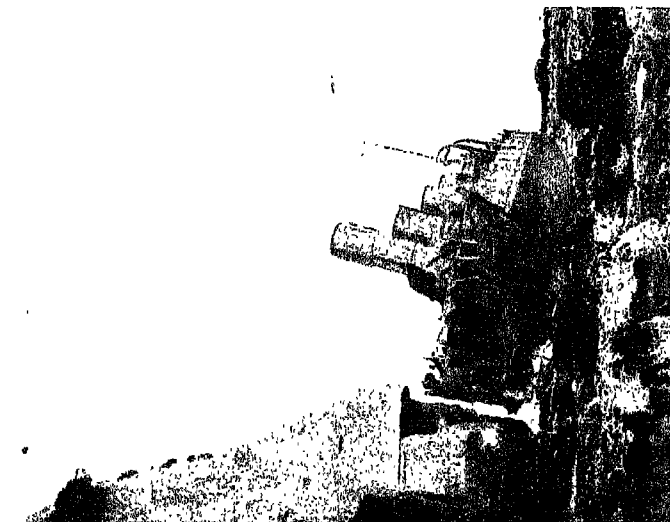
The *Tartar* was mined in June 1917. This, again, was an accident that should not have happened, although no blame attached to her officers. Being quite new to the Patrol and the various danger areas, her captain told the destroyer that was accompanying him, whose officers knew the patrol well, to lead down the Channel between the Bassure de Bas and the French coast. This she did, but went inside a buoy marking a danger area, with the result that the *Tartar* was mined. She was, however, towed in safely.

Collisions and other accidents were not infrequent. It had to be so. Dover harbour was most difficult in a gale of wind, and at spring-tides the western entrance was dangerous at about high water even to a destroyer, unless she was very carefully watched. The number of vessels in the harbour was an added difficulty, especially as trawlers were apt to bob round corners at most inconvenient times. I never took official notice of any accident, which was not the result of carelessness, and even then practically each captain was allowed three accidents, unless the carelessness was gross. To have more than three accidents was too expensive!

I wonder if the captains of the boats realised how heart-breaking it was to the Admiral, when perhaps he was gradually collecting a few good boats, to have one or more relegated again to the dockyard through want of care in their handling. But still, accidents were bound to happen—and there was nothing for it but resignation and patience, for beyond all things it was necessary to make allowance for youth, long hours of work, and the necessity for every one gaining experience; and experience in a new class of boat inevitably means either close shaves to the lucky or accidents to the less fortunate.

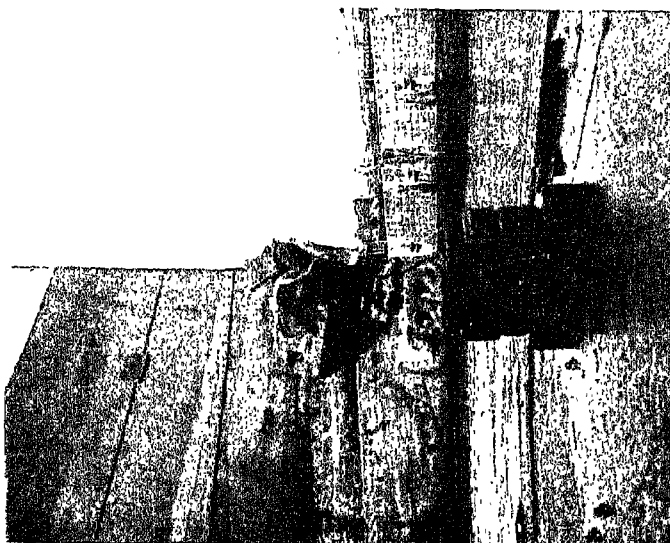
Fogs—especially at night—and absence of lights were all against the boats, and not only added to the difficulties of navigation, but to the strain on their captains. The Downs at night was no joyful place to be under way in; and, as far as possible, I avoided allowing destroyers to move about there after dark, except in the fair-way; but this could not always be arranged.

I believe the one point which led to more accidents than any other was the practice of some captains of not “conning” their boats themselves on entering or leaving harbour. Some allowed the coxswain to steer while they worked the engine. This is, in the end, a fatal habit to get into for many reasons, but is never so bad as when an officer goes to a new boat and leaves the steering to the coxswain, who has hither-



H.M.S. "NUBIAN" ASHORE AT THE SOUTH FORE-
LAND AFTER HAVING HER BOW BLOWN OFF BY
A TORPEDO.
PLATE LXIII.

362]



BOW OF H.M.S. "MILNE" AFTER RAMMING A GERMAN
SUBMARINE.

A portion of the submarine is seen on the vessel's forefoot.



FUNERAL OF A BRITISH FLYING OFFICER AT OSTIND

PLATE LXIV.

to been accustomed to be conned.¹ Then there is sure to be trouble and a visit to a dockyard. Risks inside a harbour should never be taken unless such risks are the safest procedure. Accidents prejudice the conduct of the war; a boat is not a captain's private property, to be risked or not as he likes, but an active fighting unit of the State. But, taking everything into consideration, comparatively few accidents occurred, and the handling of the destroyers reflected great credit on the whole flotilla.

On one occasion when I was at sea in a destroyer I saw the file of secret memoranda lying on a chart-house table. These, of course, should have been locked up. I therefore told my Chief of the Staff to bring them ashore when we landed, and to signal for the commanding officer to repair to my office with his secret memoranda for correction. The hue and cry after the file and its attendant anxiety would be sufficient to ensure greater care in the future. So far this was merely an incident of passing interest, but its humour lay in the remark of the mate, who summed up the matter by saying: "Well, I don't know what the Navy is coming to when you can't trust a Vice-Admiral in your Chart House."

The general work of the flotilla defies detailed description. In 1916 the Tribals—few in number as they were, and old—took practically the whole of the Belgian Coast Patrol, and at the same time provided the special destroyers which took distinguished personages to and from France.

The 12-pounder Tribals, in addition, acted as supports to the traffic line. With steam always on the engines, they were turned out at a minute's notice to hunt submarines or to reinforce the traffic routes—hard and incessant work.

The 30-knotters did escort and patrol duties, acted as guard-boats to the monitors at night off La Panne, guarded the offing of Dunkirk, acted as supports to our drifters, and assisted in the Downs. During the winter of 1917 I was

¹ To con is to direct how to put the helm instead of leaving it to the judgment of the helmsman.

careful about their being out in very bad weather, as they were getting too old, and hulls could not last for ever. One of them got into a gale, had her ventilators washed away, and she barely managed to make the Downs. These boats occasionally had some fun on the Belgian coast, but their duties were, in the main, mere hard work, which I thoroughly appreciated.

The torpedo-boats, too small for open sea work, were used entirely in the Downs to protect shipping and back up the boarding flotilla—arduous and difficult work owing to the tides, mists, and crowded state of the water.

As regards submarine hunting, this was indulged in by all vessels, not only the destroyers. The *Milne*, Commander Victor Campbell, rammed one U-boat, recovered two survivors, and brought in portions of the vessel on her fore-foot (see Plate LXIII). Others were attacked and not improbably accounted for, but I never claimed a submarine without the evidence being conclusive, so that probably several which were sunk were unclaimed. The P.-boats, somewhat later arrivals, were invaluable, and I was able to use them on account of their shallow draught in waters dangerous from mines; this, however, did not guarantee absolute immunity. They kept the sea in practically all weathers.

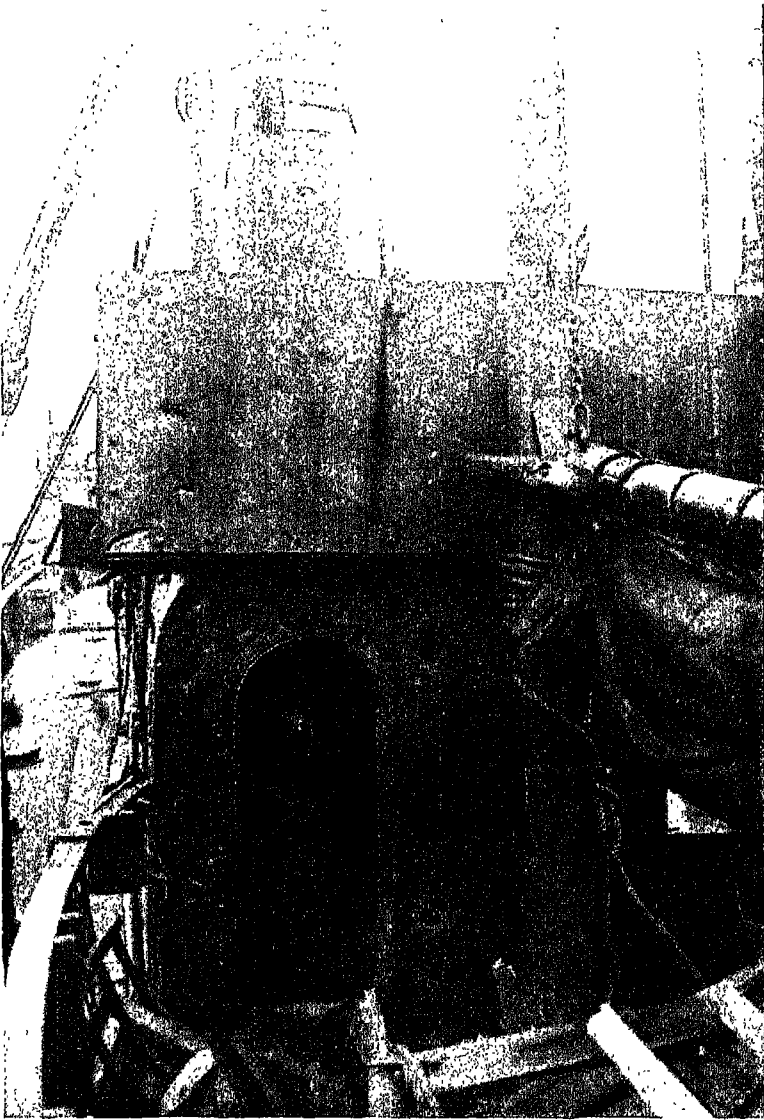
The destroyers at Dover were the terror of the German submarines, and without any doubt a submarine rarely showed even her periscope in daylight in our waters, either diving through in day-time, or slipping past at night-time.

All the captains of the destroyers deserve special mention. Some had more opportunities than others, but such is the fortune of war.

In my memory of the Dover Patrol during the war, the 6th Flotilla—the incomparable 6th Flotilla—is always present, either at sea or going out of harbour; I never seem to remember them coming in. Of one thing I am certain—no men during the war did better service for the country in any part of the globe than the captains, officers, and men of the 6th Destroyer Flotilla.



GRAVE OF BRITISH FLYING OFFICER AL OSGEND



DRIFTER AFTER BEING SHELLLED BY GERMAN DESTROYERS.

PLATE LXVI.

THE TRIBALS

It's dark as pitch and Erebus and as Hades out to-night,
With a strong gale from north-eastward, and the wind has got a bite.
There will be a big sea running, with hard squalls of snow and hail,
But we've got to keep the Channel, and go out and face the gale.

Yes, you lately-joined-up youngsters, you may think the old man daft
To send us out a night like this to be washed down fore and aft,
But the Hun would pass his raiders just as easy as could be
If he thought that we at Dover shirked the winter gales at sea.

We have had a pretty tough time. What with light-ships all put out,
With fogs and tides and gales of wind, it's been hard without a doubt.
But never has a Tribal once in the whole time of the war
Asked for leave to run for shelter, or lie doggo near the shore.

CHAPTER XIII

THE DOWNS AND MERCHANT SHIPPING

Origin of the examination service—The Downs Boarding Flotilla—Captures of German agents and contraband—The work of the armed drifters—The capture of the *Virgin del Socorro*—Destroyer and air raids—Losses of the civil population—Landing 6-inch guns.

THE Downs was, without exception, the place of greatest importance in the Dover Patrol. It formed the examination base of all merchant vessels—British and Allied or neutral—passing the Straits, whether bound to this or foreign countries. The examination service dealt with no less than 121,707 vessels during 1915-16-17.

Its functions were to stop enemy ships, to detect contraband of war, and to arrest enemy subjects. This work was most ably carried out originally by Commander R. C. Winstanley Moorsom, and then, when it was decided to place a post-captain in command, by Captain G. N. Tomlin, M.V.O., and his successor, Captain J. D. Allen, and the officers under them. As can well be imagined, it required firmness, tact, and quick perception to detect either hidden contraband or German subjects. Naturally, as merchant vessels could not be unladen, a certain amount got through the meshes of so comprehensive a net, but, generally speaking, it was an efficient deterrent to illicit cargoes.

The armed drifters who assisted in the work and also carried out other duties in the Patrol were under a separate command, first Captain Henry E. Grace, and subsequently Captain W. J. T. Saunders. These gallant little craft formed the outposts at the north end of the Downs, and, therefore, bore the brunt of any destroyer attack,

The only permanent defence force besides the drifters was two destroyers or torpedo-boats. Originally one destroyer or a torpedo-boat formed the day patrol, but, as events showed that little or no trouble was experienced in ships trying to avoid examination, I was able to take away the destroyer. At night-time I had a destroyer division, whenever boats were available, at anchor off Deal, as well as a light cruiser. They lay with slips on their cables ready to jump on the back of any raiding force that might push into the shipping. They were, of course, useless against the five-minute "tip-and-run" raid at the North Foreland, as it was impossible for them to steam the distance in so short a time; but, if a serious attack on the shipping had been attempted, they would have had a good deal to say to the raiders.

In addition, before the arrival of the *Marshal Ney* to act as guardship off Ramsgate, I kept, whenever possible, two monitors, one anchored off Broadstairs and the other in the South Downs. These, again, could merely be looked on as forts of doubtful value; but the German did so hate being shot at with 12-inch guns, even if not much chance existed of his being hit, that the monitors were of considerable use. It was a rotten class of work for the monitors—much weary watching and waiting, without much chance of achieving anything.

Early in 1917, as the enemy showed a tendency to invade the northern part of the Downs, Sir John Jellicoe, then First Sea Lord, decided to erect batteries at the North Foreland and Foreness. These places were outside the Dover Command, but, as their sole function was the protection of the Downs, he, with his usual common sense, broke through arbitrary restrictions and turned them over to the Admiral at Dover to instal and take under his command. Fortunately also the military authorities saw the necessity of their being kept under naval control, otherwise they would have been perfectly useless, and remarkably dangerous to all concerned,

as the conditions obtaining at any given instant in the waters off the coast were known only to the Admiral. Naturally, therefore, it was for him to decide whether orders to commence firing should or should not be given. These batteries will be referred to later on, as it is better, having sketched the rough outline of the organisation of the Downs Service, to deal first with the examination service and the armed drifters.

And, first, as to the Downs Boarding Flotilla. Before the war few people were aware of the organisation and arrangements made for examining vessels passing through the English Channel in war-time, and even the title of Downs Boarding Flotilla, or "D.B.F.," was so secret that it was only whispered or found in sealed envelopes. Not until December 1912 was the organisation—under the Admiral of Patrols (Admiral (now Sir) John de Robeck)—considered from a practical point of view.

Hitherto secret instructions, which were to be delivered to the Commanding Officer of the *Harrier* only on the imminent outbreak of war, were kept under lock and seal in the custody of the Commander-in-Chief at Portsmouth.

The then Commanding Officer of the *Harrier* represented to the Admiral of Patrols the advisability of being acquainted with the secret instructions before the necessity for putting them into force arose. The Admiral of Patrols fully concurred, and in February 1913 their Lordships, "considering it desirable that the Commanding Officer of the *Harrier* should be acquainted with his war orders in time of peace," issued revised secret war orders to him.

The advisability of this step was at once apparent, as, amongst other instructions, the *Harrier*, in case of requiring support, etc., was to communicate by W.T. with the destroyer patrol. At this time the *Harrier* was not fitted with any W.T. installation, but this was rectified at the next refit.

The procedure for boarding suspicious vessels in the precautionary¹ and war periods was then standardised and

¹ The precautionary period is the time between war being imminent and war being declared,

definitely laid down. This was very necessary, as hitherto neither the Commanding Officer of the *Harrier* nor the boarding officers had much idea of what their duties would be. Approval was eventually given for the retired officers detailed for boarding duties with the Downs Boarding Flotilla to go through a short course of instruction in those duties at the War College at Devonport. This was of great assistance, but it was not until May 1914 that the course was held—fortunately just in time for the war.

In the original instructions, Dover was intended to be the headquarters of the D.B.F., but this was changed in April 1913 to Ramsgate, which was preferable in nearly every way. The larger craft (armed boarding steamers, etc.) could not use the harbour, but had to be dependent on Dover or Sheerness for replenishing supplies of coal, etc. This, however, was of small account compared with other conveniences.

The original staff allowed by establishment was one Paymaster (retired), two Writers, and four W.T. operators—seven all told. In 1916 the shore establishment had expanded to:

- 1 Captain, R.N.
- 1 Commander, R.N.
- 1 Engineer-Commander, R.N.
- 3 Lieutenant-Commanders, R.N.
- 1 Lieutenant-Commander, R.N.V.R.
- 1 Engineer-Lieutenant, R.N.
- 4 Lieutenants, R.N.R.
- 4 Lieutenants, R.N.V.R.
- 2 Paymasters.
- 5 Assistant Paymasters, R.N.V.R.
- 1 Gunner, R.N.
- 2 Admiralty Overseers.
- 4 Warrant Telegraphists.
- 16 Various ratings.
- 46 All told.

This number was exclusive of the Shore Staff attached to the Armed Drifter Office; and, in addition, there were two officers and about one hundred men forming the armed escorts who were accommodated on shore—a good example of the impossibility of forecasting in peace time the requirements of a war.

Arrangements were made for six tugs to be “taken up” by the Commander-in-Chief at the Nore, when necessary, and renamed *Carcass*, *Ceylon*, *Chichester*, *Cerberus*, *Chester*, *Chub*; and these tugs, with H.M.S. *Harrier* and *Niger* as supporting vessels, formed the original Downs Boarding Flotilla.

Difficulty was at first experienced in curbing the curiosity and wanderings of the “trippers” to Ramsgate, who, at the commencement of the war, had free access to the harbour and piers, and were inclined to look upon the advent of the representatives of H.M. Navy as a “side-show.” On the principle of “business as usual,” it was proposed that the summer passenger steamer service (“trippers”) between the Thames and Ramsgate should continue, and the local naval authorities did not increase their popularity by objecting to this on the ground that the supporting vessels should have prior claim to the East Pier, which was the only place from which they could coal, and that “trippers” of unknown nationality, etc., were not desirable in the vicinity of the base.

After some correspondence, the Board of Trade concurred in stopping the passenger service, and gradually the whole of the harbour precincts came under naval control, and the public was excluded unless in possession of passes.

Local Sea Scouts were enlisted as messengers for the Navy Office, and proved most useful. One subsequently became a Midshipman R.N.R., and is now a Sub-Lieutenant in the Royal Navy.

Trinity House pilots were provided in the boarding-tugs for the free use of neutrals passing through the Downs for examination. The pilots accompanied the boarding-officers

on board vessels, and also acted as witnessing-officers, receiving pay from the Admiralty for such services. This was an expensive and unsatisfactory arrangement, which later on was abolished, R.N.R. officers being appointed as witnessing-officers—a much more satisfactory plan, as the witnessing-officers were trained and had experience in boarding duties, and so could replace boarding-officers absent through sickness or other causes.

The Admiralty having decided that the Senior Naval Official at Ramsgate was to be of captain's rank, appointed Captain G. N. Tomlin, as S.N.O., and in charge of the D.B.F., and that officer took over the duties on January 21st, 1915, being directly under the orders of Rear-Admiral Hood, the Admiral at Dover at that time.

At this period the coast from the South Foreland to the North Foreland and on to Whitstable was practically undefended and unwatched. A few movable barbed-wire barriers were constructed, and kept on the piers and harbour entrance at Ramsgate, and the pavilion on the beach was boarded up from seaward to prevent easy access.

The local authorities did not view these arrangements with favour, and were under the impression that the Goodwin Sands were Ramsgate's natural defence from any invasion, and that with these and the high cliffs, nothing further was required. A deputation, headed by the Mayor, called on the S.N.O. and discussed these matters, and subsequently every assistance was given by the civil authorities, as was always the case as soon as the situation was explained to, and appreciated by, them.

Credit is due to the Volunteers at Broadstairs who undertook the watching and guarding of the pier and beach at that place, and who, until military forces were available to relieve them, formed a valuable armed guard and kept constant watch during the dark hours.

Zeppelins were being constantly reported by over-zealous amateur watchers. Hostile submarines and spies also

abounded in their imagination. On one occasion a lady asked for an interview with the S.N.O., and reported that her next-door neighbour acted in a suspicious manner and flashed lights at night. The next day the neighbour made a similar charge against the said lady, and on investigation it appeared that they were not on neighbourly terms and each sought to bring the other under suspicion. No doubt there were many enemy subjects at Ramsgate at the beginning of the war, and one—an Austrian hairdresser—was expelled by the S.N.O.

On February 13th, 1915, Ramsgate became a base for armed drifters. As six or more drifters were always in the inner basin when standing off, they provided some sort of defence and were moored so that their guns could command the harbour entrance. Their guns were also available for anti-aircraft defence, and were in action several times. Even if, owing to small range, these guns were of little use against the hostile aircraft which frequently passed over Ramsgate, the moral effect was good, and on more than one occasion Zeppelins were seen to alter course and avoid Ramsgate when fired at. Later on armed yachts and trawlers were also available, and with the drifters formed a useful anti-aircraft battery. Two Admiralty search-lights were placed—one on Jacob's Ladder (West Cliff), and one on the top of the pavilion—to assist in the defences.

Owing to the *Niger* having been torpedoed and sunk while at anchor off Deal (November 11th, 1914), approval was given for the gunboats to be relieved by armed boarding-steamers as supporting vessels. No submarine attacks were made on these armed boarding-steamers, or on the shipping at anchor in the Downs.

In March 1915 an obstruction (nets) was placed across the Downs in the vicinity of the *Gull* light-vessel with a gateway marked by two buoys between which all vessels had to pass, armed drifters being stationed to guard the gate.

Early in 1915 traffic was interrupted by mines being laid off the Elbow Buoy. As these mines were at first always laid



Photo by Sartony, Paris.

Photo by Sartony, Paris.

ADMIRAL ROJER-ROCHON.

Frontispiece, Vol. II.

to the eastward of the Elbow Buoy, traffic was diverted to the westward of the Buoy, and this change worked well for some considerable time. It was at first thought that these mines were laid by vessels flying neutral flags, but careful investigation and examination of suspicious vessels failed to confirm the suspicion, and there is no doubt that submarines were responsible for these mine-fields. Considering the amount of shipping that passed through the Downs, very small losses resulted.

Delays to vessels were frequently unavoidable for the following reasons :

(a) Bad weather, which prevented boarding, to obviate which well-known vessels were allowed to proceed after "examination" by megaphone.

(b) Bad weather, which frequently prevented pilots from being shipped or dropped, and, when the weather moderated, there were not sufficient pilots to cope with the demand.

(c) Vessels were held up in the Downs so as to pass Folkestone at a favourable state of tide (on account of mines).

(d) Discovery of mine-fields necessitated boarding-officers giving all vessels fresh routes.

(e) Vessels were held up in the Downs on account of not being able to make the entrance of the Thames before dark.

In the early stages of the war masters of vessels were irritated by these delays, and frequently abused the boarding-officers and in some cases deliberately disobeyed orders. In most instances these cases were reported to the owners for action, but one master was prosecuted at Ramsgate and fined £10 for disobedience. However, owners and masters eventually realised that the orders were given for their own benefit, and were only too glad to receive advice as to a safe route.

The armed escorts consisted of about a hundred men of the R.N.D. under two officers, Lieutenant Froude and Sub-Lieutenant Hempson. In parties of eight or ten under a P.O., they were placed on board neutral vessels with cargoes consigned to east coast ports to ensure that the vessels, after

clearing the Downs, proceeded to those ports. They also acted as guard on the Navy Office.

During the war 426 enemy prisoners and suspects were removed from vessels in the Downs. Forty-six of these had previously passed examination elsewhere, but were proved to be enemy subjects or agents.

Boarding-officers and interpreters became expert in knowing likely places for hidden correspondence, etc., and several important captures were made.

Difficulties at first arose in connection with the search of female enemy subjects, who travelled with impunity between the United States and Holland, and no doubt conveyed correspondence. It was obvious that the boarding-officers could not tackle this job, and therefore female searchers were asked for. Two arrived from Scotland Yard on November 25th, 1915, to join the Ramsgate Base; but one of these, not having anticipated that her duties would require a trip in the Downs in all weathers, with probably a climb up a rope-ladder, resigned forthwith. Prior to the arrival of the female searcher, one suspicious German female was brought ashore from a Dutch vessel and taken to one of the local hotels at Ramsgate, where some of the officers' wives volunteered to act as searchers. From subsequent reports, this would appear to have been one of the most thorough of searches, and as it took place in winter in a room without a fire, it is probable that the suspect did not risk another invitation to visit Ramsgate.

Amongst important captures by the D.B.F. may be mentioned Émile Victor Gasche, *alias* Franz Rintelin. This man, with his colleague Meloy, was removed from a Dutch vessel in the Downs. Gasche claimed to be a Swiss subject, and was in possession of an American passport, which had been viséd four times in New York by various consuls. Meloy claimed to be an American subject, and stated that he came ashore at Ramsgate "to oblige the naval authorities."

The following extracts from newspaper reports are interesting in this connection:

"The Federal Grand Jury in New York has indicted, for conspiracy to defraud the U.S. Government in obtaining a passport, Edward Meloy and Franz Rintelin. Meloy has been admitted to bail in £2,000, but Rintelin is either in prison in England or has been shot as a spy. According to a report current in New York, he was one of the men recently executed in the Tower.

"For several months the Washington authorities had been investigating the doings of Rintelin, who was taken off a Dutch vessel on which he had secured passage under cover of his fraudulent American passport, and the official who has had the investigation in charge told me that Rintelin was the most important and dangerous of all the German spies at work in this country. He was more important and more dangerous than Count Bernstorff, Herr Dernburg, Dr. Albert, Captain von Papen, Captain Boy-Ed, or any of the other agents and he ranked so high that he was in direct communication with the very highest personages in Germany."

Here is another story :

"Franz Rintelin, the celebrated German spy, has been convicted, with ten other Germans, of conspiracy to place bombs in the vessels leaving New York with food stuffs for the Allies. Rintelin was paymaster of the Teutonic bomb-placers. He has been sentenced to an aggregate term of two years' and six months' hard labour and fined £400."

A case of local interest was that of a certain German woman who came under suspicion on arrival at Ramsgate. Inquiries were made and sufficient evidence was obtained for the S.N.O., as the "competent naval authority," to prosecute her under D.O.R.A. The case was heard at Ramsgate on October 9th, 1916, and she was sentenced to six months' imprisonment in the second division. The conviction and sentence were subsequently upheld on appeal. This woman, on being questioned by the S.N.O., maintained that she had no knowledge of Germany or the language, but subsequently, when asked if she had any children, replied "Nein." It was thought

at first that she had nine children, but such was not the case, and the use of the negative in a language which she professed not to know or understand was unfortunate for her.

Something must be said of the raids and bombardments.

In March 1915 a Taube appeared over the Downs and dropped bombs amongst the shipping, but without doing any damage. This was the forerunner of many further visits. The first Zeppelin attack on Ramsgate occurred at 1.50 a.m., May 17th, 1915, when the "Bull and George" Hotel was wrecked and other minor damage done. Incendiary bombs dropped close to the Navy Offices, but mostly fell into the water and did no damage. Two lives only were lost on this occasion.

Air-raid warning sirens were established at Broadstairs and Ramsgate, and the S.N.O., Ramsgate, was requested to control the sounding of these. The sounding of these sirens, anyhow, as far as Ramsgate was concerned, had, in the early stages of the war, the opposite effect to what was intended, for it was followed by a general assembly of inhabitants in the streets to see what was going on. Partly for this reason and partly so as not constantly and needlessly to alarm the inhabitants, endeavours were made not to sound the sirens unless an aerial attack on Ramsgate or Broadstairs was imminent.

On March 19th, 1916, Ramsgate suffered seriously from the first organised attack. Hostile aircraft approached the town from the seaward at about 2.10 p.m., and dropped several bombs, killing seven and injuring ten civilians, most of the unfortunate victims being children who were on their way to Sunday-school. On account of the siren not having been sounded in sufficient time on this occasion to give warning, an unfortunate controversy arose between the local civil and naval authorities. At a public meeting convened by the Mayor, the local naval authorities were adversely criticised, and it was stated that the civil authorities should have the control of the siren, and not the naval authorities. Questions were asked in Parliament, and it was stated that no siren

warning was given, as there was no officer on duty at the Navy Office. Needless to say, such was not the case. An unfortunate delay occurred in passing through the public telephone the order to sound the siren. Subsequently the local authorities requested the S.N.O. to continue the control of the siren, but this he declined to do.

The population of Thanet displayed great calmness under their many trials, and there were no panics. The following is an admirable instance. On September 13th, 1915, an aeroplane dropped bombs close to Messrs. Bobby's premises at Margate. Although the building was shaken, the ladies' orchestra in the tea-room continued playing during the bursting of bombs.

An important duty of the D.B.F. in the early stages of the war was to take charge of prizes and suspicious vessels brought into the Downs and arrange for their escort to the Thames. On November 12th, 1914, the sailing vessel *Kwango* arrived in the Downs. Her crew and officers consisted mostly of German reservists, who appeared surprised to hear of the declaration of war. The vessel was sent to Gravesend under escort.

Captain Tomlin, R.N., deserves great credit for the efficiency of this service during the three years he commanded the D.B.F.

Such is a brief, very brief, sketch of the main functions of the Downs Boarding Flotilla, carried on in all weathers and under many difficulties. Their work largely aided the blockade of Germany, to which powerful economic weapon the ultimate collapse of that nation and her armies was mainly due.

Early in the war a rather dramatic event occurred at sea off the Downs.

In a very severe south-west gale, accompanied by a heavy sea, the *Montrose* (filled with stones, etc., and waiting to be sunk as a block-ship inside Dover harbour), broke from her moorings and drifted out to sea. This was a remarkable event, as she broke away from the Admiralty Pier on the west side of the harbour after dark, drifted right through the ship-

ping, and, driven by the gale, passed through the eastern entrance of the harbour without doing any damage—a marvellous passage, since she was not guided in any way. Two men constituted her crew. On receipt of a signal the *Ceylon* (Lieutenant Butler and Sub-Lieutenant Bolger) immediately went in search of the missing vessel, but without success, until, after searching for an hour or so, the *Ceylon* came upon the tug *Lady Crundall*, who said that the *Montrose* was in the vicinity, and that she (*Lady Crundall*) was standing by until the weather moderated. After a further short search the *Montrose* was picked up on the edge of the Goodwins, and, after giving a blast on the siren, a small flare was observed. As it was impossible, owing to the weather, to go alongside her or to launch a small boat, it was decided to try and back the *Ceylon's* stern up to the vessel's lee side, so that the two men could jump on board. This also proved to be almost impossible, as it was found that the *Montrose* had been fitted with nets (apparently torpedo-nets) which, being washed about in all directions by the heavy sea, were constantly getting in the way. After many attempts, the *Ceylon* was able to get close enough for one man to jump, and half an hour later the *Ceylon* was successful in rescuing the second man. The two rescued men, who were suffering from exposure, said they thought it impossible to save the vessel in such weather, as not only were the wires on board tangled, but the iron bits were broken. The idea of trying to tow the vessel off was given up for the time. Further attempts to save her were subsequently made, but in the end she had to be abandoned.

What shall be said of the Ramsgate drifters? These gallant little vessels were originally intended as a protection to the examination service, and the vessels in the Downs generally, against submarine boats. At first they consisted of 20 vessels only, but in March 1915 10 more were sent. Of these thirty vessels, five were lost through mines and collisions, with 7 officers and 55 men out of a total of 30 officers and 300 men—

a large proportion, and probably as great as that of any unit during the war. Captain H. E. Grace did excellent work in their original organisation, and subsequently Captain W. J. T. Saunders carried on the command with conspicuous ability.

The duties of this small fleet gradually expanded, and during 1915 the patrol of the Channel immediately to the west of the old mine-field was undertaken by them—an exposed patrol, but a useful one for preventing ships breaking through up and down Channel.

In the winter of 1916, after the cross-Channel barrage had been laid, had this patrol been continued, it would have been completely cut off from the Channel, as its line of patrol was to the eastward of the barrage. Moreover, the barrage, it was hoped, would take the place of the patrol. I therefore withdrew the drifters, used some for escort work, and when the Folkestone mine-field was laid, called several down to take up station on that line in order to help in forcing the surface submarines to dive into the mines. Further, they were in 1917 all fitted for mine-sweeping, which released the mine-sweeping trawlers hitherto employed in the Downs.

Submarines rarely entered the Downs. The German *U*-boats did not like coming into water less than ten fathoms in depth in case patrol vessels forced them to dive, but the water close to the Elbow Buoy was a favourite mining-ground, and here submarines were occasionally met with. In March 1915 the *Campanula* met and grazed one in this vicinity. On several other occasions, submarines were sighted, but no report of a submarine in the Downs—not the Straits—was ever thoroughly substantiated.

The drifters performed valuable service in regulating traffic, keeping merchant vessels clear of mined areas, and rendering assistance to vessels in distress. On November 3rd, 1915, the *Corona* picked up the disabled Norwegian steamer *Syrus I*; the crew were taken off by the drifter, and Lieutenant Irvine, R.N.R., and three men spent the night on board trimming the vessel, which next morning was towed into Ramsgate by the

Corona and *Rooke*, in a north-west gale with a heavy sea. I am glad to say that £2,000 was awarded for salvage. On March 7th, 1916, the *City of Glasgow* rescued four French airmen on a sea-plane in heavy weather near the Elbow Buoy. The small rescue-boat capsized, and the rescue party was, with difficulty, saved. The sea-plane had a weird experience. Off the Belgian coast a French sea-plane got into trouble and had to land on the water, a second one went to her assistance, but could not rise again. One plane was smashed, so all four occupants had to get into the one uninjured plane, and this frail, overloaded craft drifted before strong easterly and south-easterly winds right across the North Sea; two men in the body and two standing on the wings. They were most fortunate in being picked up, as they were greatly exhausted, and the sea-plane was barely holding together.

Lieutenant Irvine, of the *Corona*, assisted the trawler *Abelard*, which was mined, into Dover, and received a letter of appreciation from the Admiralty for his judgment and seamanship on this occasion.

In November 1916 the *Virgen del Socorro* was captured by the drifter *Paramount*. This schooner had on board thirteen German army officers and non-commissioned officers, who had been fighting in the Cameroons. They crossed into Spanish territory and were interned and sent to Spain, some to Pamplona, some to Alcala. The following is a brief summary of their adventures. The prime movers in planning the escape were Carl Koch, an officer reservist in the Colonial Army, who had been employed before the war as an Inspector by the South Cameroons Rubber Company, and was interned at Pamplona, and Gratschus, a non-commissioned officer in the Colonial Army who was interned at Alcala. These two had got into touch with a law student at Vigo, who introduced them to the seamen interned at that port. The student, whose movements were not restricted, undertook to endeavour to purchase a sailing vessel, and for this purpose proceeded to Corunna some time in September.

The *Virgendel Socorro* was selected, and sent round to Vigo for approval of the seamen. On her arrival there she was purchased for 11,000 pesetas. Koch and Gratschus had collected a number of their friends, who were willing to join the enterprise, and about a dozen of them subscribed the money required.

It would appear that the precautions taken by the Spanish authorities to prevent escape from internment were not very efficient. The watch kept by the police at Alcala railway station was so careless that seven men from the town had no difficulty in going by train to Madrid and so to Vigo. Those at Pamplona hired an automobile and took train at Palenzia. All arrived without any further difficulty at the rendezvous at Vigo. The vessel sailed from Vigo at about 2.30 a.m. on October 7th, 1916. She was badly found, had little spare gear, and no boat. The intention was to sail round the North of Scotland and make for the coast of Norway, but very heavy weather was encountered, and when a position about 330 miles off Galway was reached, the rudder was badly damaged in a westerly gale, so that it was impossible to carry out the intention. Accordingly the vessel was allowed to run before the wind until Trevoise Head was sighted. A shift of wind took her up the Smalls, where she was nearly lost by running ashore. Another shift of wind enabled her to make Trevoise Head again and sail round the Scillies and so up the English Channel. Three destroyers or torpedo-boats were sighted, one off the Start, one off Portland, and one off Dungeness. So long as she kept to the ordinary traffic-route up Channel she would not have attracted any suspicion, as she would have been examined as usual in the Downs; but, either to avoid this or from ignorance, she kept to the eastward of the Goodwins and ran up against the *Paramount*, and was taken in for examination by that vessel and the *Present Help*. Their cruise ended, therefore, in a prison camp.

Another instance of good work may here be cited. On May 14th, 1917, the *Try Again*, Skipper C. E. Eves, tried to

stop by signal the s.s. *Waterville* of Leith, which was entering a mine area. The steamer, however, struck a mine and wound the nets up on her propeller, which stopped her engines. The *Try Again* steamed into the dangerous area and towed the *Waterville*, which was in a sinking condition, for five and a half hours to the *Gull* Light-vessel, where a Dover tug took the vessel over. Salvage was awarded, but for some reason the *Try Again* did not share in it, which was the cause of much disappointment. Several other salvage cases occurred, and the drifters were continually rendering assistance to sea-planes in distress. Their scraps with air-craft were too frequent to detail. Many tons of bombs were dropped near them, and thousands of rounds were expended by the drifters in return, with the usual result that each side occasionally claimed a hit. But these claims were always open to doubt, unless supported by the strong evidence of a dead body or a smashed-up plane.

On November 24th the Ramsgate drifters captured the *U. 48*. The submarine patrol of our *E*-boats, which resulted in the sinking of a *U*-boat, upset the Germans considerably, and without doubt they altered the route of their boats nearer the Goodwins. This resulted in *U. 48* fouling our nets which ran to the northward of the Goodwins, and she drifted on to the sands. In the morning she was observed by the drifters *Paramount*, *Majesty*, and *Present Help*, who were later on joined by the *Feasible*, *Acceptable*, and *Glaud Hamilton*. Without any hesitation the drifters closed and fired on the boat with their 6-pounder guns. The submarine returned the fire with her 4-inch, and slightly damaged the *Present Help*. The Germans, however, saw that the game was up, blew up their boat, and surrendered.

An unpleasant surprise awaited the *Campanula* one morning when she weighed her anchor, and brought up with it a German mine to the surface. Most fortunately it drifted clear, and was eventually taken in charge and dismantled.

The last of the doings of the Ramsgate drifters that remain to be narrated are their actions with the enemy destroyers ;

and here it is as well, perhaps, to consider generally the defence conditions of the Downs. The ordinary traffic to the Downs from the northward came from two directions, the north coast traffic, which normally passed just east of a shoal called the Kentish Knock, lying between Orfordness and the North Foreland, and the traffic from the Thames which sloped away to the north-westward to the *Tongue* Light-ship. Now, of course, it was necessary, so long as traffic continued, to keep navigational lights, such as light-ships, light-houses, and light-buoys burning to prevent shipwrecks; but these, in turn, were of the greatest assistance also to the enemy submarines, as, by lying close to these, they were certain of the exact position of their own mines, and so ran no danger from them themselves, a point sedulously observed by them on all occasions. Again, our own traffic usually passed fairly close to these same light-ships or buoys. Consequently these spots were well chosen for mine-laying.

During 1915 the traffic from the north coast kept to the peace route, and was not diverted, but the dangers of this route became so great that ships were eventually diverted inside the Thames shoals, through the Black Deep, and, therefore, in turn approached the Downs from the Edinburgh Channel, and the *Tongue* Light-ship on the same course as the Thames traffic. This enabled us to extinguish the North Goodwin Light-ship, and to move the Elbow Light-buoy, which marked the north entrance of the Downs, farther from the direct line of traffic. At the same time a flanking line of nets with explosive mines was run from the north end of the Goodwin Sands to the Elbow Buoy to stop entry into the Downs from the eastward. This line accounted for certainly one German submarine, and probably more.

On May 13th, 1917, the *Loyal Star* reported a submarine off the North Goodwin, and subsequently a heavy explosion occurred in the mine-nets, and on other occasions good evidence existed of damage to, if not destruction of, an enemy's boat. The line of nets was comparatively easy to keep in

efficient condition, being in line with the tide, and the water reasonably shallow.

To raiding destroyers the north entrance of the Downs was open anywhere between the Elbow Buoy and the North Foreland, but the shoals off the North Foreland, although not directly dangerous to them at high water, reduced their speed considerably. There was no obstruction of any kind between them and the merchant vessels in the northern anchorage. I had no destroyers to spare for the patrol of the entrance, as those which anchored in the Downs were resting, having spent the previous night on patrol in the Straits, besides which the southern anchorage also had to be protected. The patrol of the northern entrance therefore fell to the drifters, and well they carried out the work. The chances, of course, were that one or two might be sunk, or at all events badly handled in a raid, in the same way that the drifters in the Channel were open to more or less unsupported attack, for support in raids, to be effective, must be instantly available. The chance of such damage had to be accepted in order to obtain warning of the approach of the enemy and give our destroyers time to slip and protect the shipping.

At the same time, a similar patrol was kept at the south entrance to the Downs. On November 23rd, 1916, the drifters at the southern entrance were placed so as to give warning of a destroyer raid. The official account is terse and worth quoting: "German destroyer flotilla attempted to pass south inside Downs at 10.45 p.m. Sighted by drifter night patrol, which gave alarm. Destroyers opened fire, replied to by drifters. *Acceptable* hit and damaged. No casualties." Six German boats carrying three 4-inch guns against four drifters carrying each one 6-pounder, but nevertheless returning the fire! But the main object was attained, namely, warning was given, fortunately without casualties, and the destroyers made off.

On February 25th, 1917, several German destroyers appeared in the North Downs, shelling the Kentish coast and drifters.

Two civilians were killed. After this I withdrew the drifters from the more exposed positions from the North Foreland to North Goodwin Light-ship, to a line from the Broadstairs Knock Buoy and the North Sands Head, as the latter was sufficiently far north to give warning, and not so much exposed as the former.

On March 18th four German destroyers attacked the night patrol and Ramsgate. The drifter *Redwald* was badly damaged with six shell-holes; the skipper and one rating were wounded, six others being slightly hurt. The drifter was beached by the skipper and afterwards brought into harbour. There were no casualties ashore.

The *Marshal Ney*, which had been fitted with a good battery of 6-inch guns, arrived on April 2nd, and the 6-inch batteries at Foreness and North Foreland, previously mentioned, were soon afterwards completed. I wished to make a really good evolution of mounting these guns, but was rather disappointed, as ten days were taken over the four guns. Weather and slippery chalk were against the work; four days was the time the work should have taken—that is to say, for the transport of gun-mountings from Broadstairs Station and their erection. They were, however, in plenty of time for the next raid. The plotting instruments were made in Dover dockyard. A house was taken for a plotting-station, and all the necessary telephone connections were made within the fortnight.

The *Marshal Ney* made a third to the two shore batteries. The whole of the northern sector, from the shoals off Margate to the *Gull* Light-ship, was now covered by 6-inch gun-fire. The one and only vital requisite was that these batteries should open fire on everything that was seen. It was absolutely necessary that, having installed the batteries, there should be no nonsense about challenging; so I obtained Admiralty permission to have the whole area of their fire prohibited for vessels at night, and the orders of the battery commander were to fire on everything seen. This did not affect traffic adversely, as traffic to the Thames was in any case

held up till after the morning sweep of the passage through the shoals in the Thames had been completed.

This necessitated special arrangements to pass through vessels on urgent service. On several occasions such ships were passed through without trouble or misunderstanding, which fully justified our action in instituting the firing-on-all-without-challenge principle. There is too much fooling in war by the introduction of arrangements which are quite unnecessary. I remember one ship in which I was torpedo lieutenant, and had charge of the gun circuits. There were so many safety devices introduced to avoid accidents that were never likely to happen that for some months we were hardly ever able to ensure a gun going off. The danger in action of guns failing to fire had never been balanced against the theoretical possibilities, to guard against which the safety devices had been introduced. And so with the batteries; if batteries are installed in places where raids are probable, then fire at everything. Warn friendly vessels that if they do play about in the vicinity they will be sunk, and when once they realise you are in earnest there will be no trouble. Damage and loss of life and property will eventually occur if the theorist is allowed to forecast what may happen under conditions fabricated by a hypertrophic brain.

On April 27th, 1917, Ramsgate was shelled, and the batteries and the *Ney* opened fire on the destroyers. No drifters were in action. Two civilians were killed and two injured. This was the last raid on the Downs. The Germans did not like the 6-inch gun-fire, and a further reduction of the lights in the Downs was made. I put forward the following proposals to the Admiralty, and they were at once approved. "Put out the *Gull* light and wreck buoy-lights. Dim the Goodwin fork and gate buoys and Deal pier-lights. Put out the anchor light of the South Goodwin, which shows all round, while the group-flashing light should be obscured through all but the up-Channel sector. The *Marshal Ney* to show a two-mile red light from her masthead for fixing purposes. Remove the

N.E. and East Goodwin buoys (these are not required, as no ships pass near them), and obscure the North Foreland light, except to show a white sector up the fair-way, with a red sector over the shoals."

All this, to the non-technical reader, may not convey much, but briefly everything was put out, and buoys were removed, which showed more than one mile from the fair-way, except a narrow beam from the North Foreland to lead vessels up and down in safe water. Nothing showed out to sea, so that the enemy destroyers had nothing except the Elbow-buoy to help them, whereas our vessels could navigate the Downs with care in safety.

Perhaps it may be asked why this was not done before. The answer proposed by Lord Fisher to the parliamentary question asking, "If the new scheme of naval education was a success, and, if so, why it had not been instituted before," applied to this case. His answer was: "The reply to the first part is in the affirmative. With reference to the second part, the same question might be addressed to the Deity as regards the Creation." But this was not all. I hung on to navigation at night, as long as it was possible, but with the restrictions on vessels entering the Thames till after the morning sweep, and with increasing raids practically up to the North Downs anchorage, it became necessary to stop night-sailings. Navigational lights, hitherto a necessity, now became redundant, and so could be dispensed with. The northern examination service was moved to Southend, and no further alarms or excursions took place.

The total casualties ashore among civilians were, I regret to say, eight killed and eight wounded. This must be considered remarkably few for three years of the war on that part of the coast most nearly approaching the enemy's coast. Sea-board towns, as Mahan points out, must be prepared to receive "scratches of the skin" in war-time. The fact that the North Foreland, flanked by Margate, Broadstairs, and Ramsgate, jutted out into the North Sea, made the fortune

of this area in peace-time. The bracing air rendered this part of Kent valuable for preparatory schools. But the same cause that led to prosperity in peace led to danger in war, and, mind you, had the enemy had any real bite in him, he could have given this area far greater punishment.

Another point to ponder over is that really it was no part of the Navy's business to protect shore towns from raids. The Admiralty had always insisted on the possibility of the enemy landing 60,000 men in England as a raid. They obviously could never promise immunity to any area from five-minute lightning raids of fast destroyers! As I have said, I deeply regretted the loss of civilian life. But nothing in the world would have made me depart from the sound policy of devoting my small resources to the defence of the shipping in the Downs, even had the casualties been a hundred times greater than they were. Had such casualties occurred, it was for the Admiralty to consider if additional vessels could be spared from capital employment to assist in the protection of any particular coast town and to lay the raiders by the heels, and it was for the Press to quiet public resentment and educate people in the essentials of sea warfare, and the folly of risking material loss in checking comparatively immaterial damage. The Admiralty wisely devoted their vessels to war purposes.

I think credit may be claimed for all concerned, that the traffic through the Downs, with strong tides, fogs, and gales, was regulated with few losses. In addition to those ships which were mined, which have been included in the mining casualties, only one merchant vessel was actually lost by collision or grounding, but many to which accidents occurred, were assisted, and no less than nine salved by the Downs Boarding Flotilla. Two of the flotilla were unfortunately lost, the tug *Char*, supposed to have been sunk in collision, was lost with all hands, and the armed yacht *Marcella* which met the same end. The *Peel Castle* was badly damaged by an outbreak of fire, which eventually was got under in spite of difficulties encountered with exploding ammunition.

A peculiar and unfortunate accident happened in Torpedo Boat No. 4. One of her torpedoes was fired when the tube was secured in its inboard position, with the torpedo pointing at the funnel. There were two safeguards against the torpedo being fired and exploding, but explode it did, and most unhappily killed fourteen of the men. The boat had to be sunk to put out the resulting fire, but subsequently she was salvaged.

On June 17th, 1917, a Zeppelin dropped a bomb on the Naval Store, and a quantity of gun-cotton was exploded, completely wrecking the building and shattering nearly all the glass of the houses fronting the harbour. There were happily no casualties.

It is interesting to note how the historic anchorage of the Downs played so important a part in the war—another example of the way in which geographical positions retain their importance in spite of centuries of change in war material and methods.

Dover, more or less of an upstart harbour, was valuable, but could never, as an examination anchorage, have taken the place of the Downs. Had Calais fallen to the Germans, guns would soon have reduced the shore buildings at Dover, and much of our work would have had to be transferred to the Downs. Probably Richborough would have become a repairing base. Fortunately, we were spared this inconvenience.

Such is a rapid and incomplete survey of the activities of the Downs Boarding Flotilla. Absolutely unadvertised, the officers and men met bad weather, difficult boardings, night and day work, risky patrols, in the hardy way that the war taught this country to admire in our Merchant Service and fishermen. Apart from two naval officers directing, nearly all the rest of the personnel were reservists. Some day the people of this country will realise, not merely repeat as they do occasionally, parrot-like, in vague platitudes, the debt they owe to our irregular sea forces. Then they will never pass a merchant sailor or deep-sea fisherman except with a warming of the heart, and a genuine feeling of pride in their brotherhood with the sea-faring population of these islands.

THE DOVER PATROL

THE GRAVEYARD

The waters of the eastern part of the Channel and off the entrance of the Downs are one of the graveyards of the world's shipping.

Could the Channel streams be parted,
As once the Red Sea clave,
And, hurled to east and west apart,
Be held in pent-up wave,
How sad a sight our eyes would meet
Of that forgotten hidden fleet,
Long lost in that vast grave!

The coracles of ancient time
And Roman galleys rot—
Naught but a patch of oozy slime
Remains to mark the spot—
The ships long sunk by Francis Drake,
Hubert, De Reuter, Monk, and Blake,
Then mourned, but now forgot.

Of many a gallant trader,
Homing from distant East,
When a gale or fog betrayed her,
And sank her to her peace,
The masts once taunt and yards once square
Stand barnacled, of canvas bare,
Tombstones of her decease.

Our loss throughout the present war
Sadly your tale assists
By adding more than twice three-score
To those heroic lists,
Which your dread graveyard took as toll
Of merchant ships and the patrol
And their antagonists.

When in peace time ye of England
On pleasure bent once more,
Cross that strip of Channel water
Which spreads from shore to shore,
In thought, at least, salute anew
Those tombed below who died for you
And England in the War.

CHAPTER XIV

THE BARRAGES IN THE CHANNEL

The earliest form of barrage—Its mechanical impossibility—Breakdown and removal—New types of mine and net barrage instituted—Further difficulties owing to mine-dragging—Removal of the barrage and its relaying—General review of the defence—A mine-ladder scheme—Delay in laying the Folkestone Mine-barrage owing to mines not being available—Additional proposals—The Barrage Committee—General remarks on the working of the barrage—Approval for shallow mines obtained.

TOWARDS the end of 1914 and early in 1915 preparations had been made to place an obstruction across the Channel from Folkestone to Grisnez, having two gates in it, one of them one mile from Folkestone and the other one mile from Grisnez.

It is one thing to theorise and devise obstructions at a drawing board, calculating the statical stresses, and another to see that structure in a sea-way with a strong tide running. The independent motion of each fraction then becomes most apparent, the lines of white foam which make the whole length of the barrage a milk-white band, the fierce blow of the wave-crest on the buoys—all these help to indicate the difference between theoretical and practical conditions; but, while observing the surface portion rolling and tossing, the mind should be able to form some conception of the commotion that is going on below. The heavy cables from the mooring-buoys running to the moorings alternately tauten and slacken, lifting the ground-chains from the bottom at one moment as the sea strikes and lifts the buoy, and dropping them with a thud as the buoy dips into the hollow of a wave.

The motion is quite different from that of a ship riding to

an anchor; then the long length of chain assumes a uniform catenary from the bow to the bottom, a slight lift and tautening occurring as the ship moves a little astern owing to the wind and sea. The motion of each link in the other is barely measurable; the whole length of chain acts as a single spring, the weight and catenary gradually checking the ship and causing her to forge ahead again in a lull. The only links of chain that suffer as a rule are those in the "nip" of the hawse-pipe, which are unduly stressed by the angular bend on being taken into the ship. But, even under these conditions, those who have ridden at anchor in a sea-way in a gale know full well that the chances of parting in twenty-four hours are considerable; and, as they watch the cable tauten almost to a bar, they wonder that a chain can hold even as it does.

In the case of a barrage the use of pendants of chain of a length of four or six times the depth of water, as would be used in the case of a ship, is out of the question. The spring-like action of a long length of chain is, therefore, largely reduced; the motions of certain links are much magnified; the grinding action is accentuated. The only chance of such moorings holding in a Channel gale is to reduce the strain on the chain as much as possible; but if, as in the Folkestone Barrage of 1915, heavy wooden baulks, some twenty in number and weighing four tons each, exposing square sides to the tide, are strung between the mooring-buoys, the pull on the buoy becomes great, the stress on the moorings correspondingly mounts up, and the grinding is increased beyond the possibility of the steel to resist abrasion. The line contact between the rounded links becomes a flat surface, the flat has its angles chawed off, grit gets deposited between the surfaces, and the metal is quickly worn through. Portions of the links of the Folkestone chain that were thus chafed through were extraordinary to look at; rings two and a half inches and over in thickness were cut clean through after a few weeks' service.

Nor was this all. One weak spot meant the breakage of a whole portion. Breakage at one place meant increased strain

on the remainder, since there were less moorings to take the same strain, and so further breakage occurred. If a surface-wire parted, a long stream of heavy floats tailed off end-on to the tide. When the tide changed this floated back partially round the buoy, partially over the next section, and then things fairly began to hum. The buoy, throttled by this unconventional necklace, suffered increased strain and probably parted its chain. In any case, a knotting of baulks and wires went on which almost defied unravelling, except by waiting for a fine day to tow the whole mass in under a lee from wind and tide.

Commander Eldridge, a very capable and hard-working officer, was in charge of the construction of the Barrage, but soon he reported that progress was impossible, since the breakages occurring in the longer-laid portions balanced the new work laid out. A visit to the boom in quite average weather showed the difficulty of handling a tangle in a sea and tide-way from a trawler. Clearing a block of lumber on a river was not in it with the lifting, swirling mess of hawsers and floats. However, three times I urged him to try again, and wholeheartedly he worked until at last I was forced to report to the Admiralty that the whole scheme was impracticable, and that the remnants of the boom were becoming a real danger to navigation by strewing the waters of the Channel with vagrant floats and mooring-buoys, some of which fetched up on the coast of Essex and some off Ostend.

Admiral Sir H. Jackson, then the First Sea Lord, having fully satisfied himself as to the impossibility of success, approved the abandonment of the scheme. The decision was of interest as he had had in his earlier days considerable experience of the difficulties of maintaining an anti-destroyer boom at Spit-head of far less ambitious dimensions, and in a much more sheltered position than the Folkestone one, and therefore knew thoroughly the essential practical troubles inherent in obstructions moored in a sea-way.

It was evident that, if any moored obstruction was to last

in such a tide-way, it would have to be of the lightest possible description.

The satisfactory working of the moored nets off the Belgian ports, of which an account has been given in Chapter VI, gave hopes of making use of some such system at the entrance of the Channel. Of course, the proper position for the Barrage was between the Goodwin Sands and the French coast. The distance between the Goodwins and the French coast was longer than between Folkestone and Grisnez; the maximum depth of water was about the same; the tides were approximately equal in strength. The more easterly position was more difficult to defend, but had the advantage of protecting the coast-routes to the Downs and to Dunkirk. It seemed that, as we had been able to maintain a net barrage within twelve miles of Ostend and Zeebrugge for a whole summer, the same might be done with a net barrage at the entrance of the Channel.

There were, of course, two fundamental differences between the two projects—first the depth of water in the Channel was much greater, so that whereas 40-foot, and, at the outside, 60-foot nets would close the waters on the Belgian coast, 120-foot nets would be required in a good deal of the water at the entrance of the Channel.

For a moment it is worth considering how moored nets of this nature work. The net is held lightly in a frame of flexible wire-rope by steel clips. In the net are two mines which, when bumped, complete an electric circuit from a battery moored in a convenient separate receptacle, and the mines explode. When a submarine strikes the net the clips break, and the net is carried on by the submarine on its journey. The stream lines of the water force the net close to the submarine, and the mine bumps and fires. Such a system, of course, necessitates electric connecting-cables and batteries. Now consider the action of such a net in a tide-way. If the tide is running strongly the net bulges out owing to the friction of the water on the wires which form the meshes, and severely,

but evenly, strains the clips that hold it. The clips must be strong enough to stand this strain. If a submarine now comes along in the same direction as the tide is running, the extra pull on the net parts the clips, and, provided the mines are correct, they explode, and the submarine is damaged by the explosion. If, however, the submarine comes up against the tide, the nose of the submarine first takes the net and relieves the strain on the clips, then bellies it against the tide till the clips again take up the strain, and, finally, the fine mesh of the wire of the net is pressed hard on to the nose of the boat with a strain due to both the friction of the tide and the strength of the clips. The result is that the submarine will probably cut its way through the net when it is travelling against the tide, while the net will most likely work if the submarine is moving with the tide.

It was absolutely impossible to use nets of anything approaching 120 feet in depth on account of the severe strain brought on the clips by the tide. Eighty-foot nets were tried, but had to be abandoned. Sixty-foot were the deepest possible on the less strong tides, and forty-foot in the stronger, and in the localities where the tide ran with a maximum strength, vertical wire uprights with mines, but without horizontal bars, had to be used. To compensate for the shortness of the net, I tried to fill in the gap below the nets with a mine barrage, but at a sufficient distance off to enable the nets to be worked with safety. It must be appreciated that the maintenance of such a net-barrage meant absolutely incessant work on the part of the drifters; new sections were always in course of preparation to replace old ones; and every day, summer and winter, when the sea and tide rendered work possible, old sections were taken in and new ones laid out. This was, in fact, a wall of nets, moorings, and batteries, in length equal to the distance between Windsor and London, or one-third of the way from London to Brighton. These distances suggest the magnitude of the task.

It will be seen that the fundamental difference between this

and the old Folkestone Barrage was the reduction in stress on the moorings of the buoys by using lighter nets and the reduction of surface area to the tide and sea.

Troubles of a grave nature were encountered. In the first place, the buoys dragged their moorings in south-westerly gales, with a strong east-going tide. This was overcome by using larger chains at the anchors and light pendants to the buoys, but at times the task seemed almost hopeless. Nothing but the cheery energy of Captain Bird and the dogged pluck of the drifter crews enabled the Barrage to be maintained. Chafe of the chains in the trunk of the buoys gave trouble. This was got over by fitting filling-pieces in the trunks to steady the chain and prevent chafe. The clips broke, the electric circuits chafed and made earth, the battery boxes leaked—in fact, every item gave trouble, but by steady plodding the whole was rendered fairly efficient.

Of course, such a huge stretch of nets was never efficient throughout its length, especially after several days of bad weather; but this did not matter. The enemy never knew which position was and which was not efficient; whatever deterrent effect it had on their operations was the same, whether the whole or at times merely certain sections were in working order.

As soon as the line was laid to the Ruytingen Buoy, laying the lines of mines was commenced by trawlers, and the *Wabine* mine-layer filled the gap between the bottom of the nets and the bottom of the sea. These mines were laid half a mile to the westward of the nets. Shortly afterwards serious trouble arose owing to the mines dragging their sinkers and fouling the nets while the latter were being hauled. One serious accident occurred to a drifter. On another occasion a mine was hauled in the nets, fortunately without accident. There was no help for it, but all the mine barrage had to be removed. The nets had to be taken in, the anchors had to be weighed and the whole of the mines swept up. In weighing the anchors the *Alert*, Trinity House tender, was sunk by a mine.

Here it is well to remark that the whole of the anchor work had been done up to that time by the vessels lent by the Elder Brethren of the Trinity House, to whom the Patrol owe a deep debt of gratitude. The Admiralty had no vessel to spare, and but for the assistance of that body, both in this respect and also in the provision of buoys and chains, we should have been completely done. The loss of the *Alert* was a great blow, not only on account of the increased difficulty of doing our work, but because of her previous great services. Always ready to help, always at work, she had become one of the features of the Patrol. I deeply regret that few of her crew were saved, the men unfortunately having just gone to dinner when the mine exploded under her bow. This, on top of all our troubles, was almost disheartening; but, in the Patrol, the greater the set-back the more the sterling qualities of the officers and men shone out. Trinity House lent another vessel, although it was some time before she could be completed and sent, and then the work of re-laying the nets once more went on. Eventually it was again completed, and the line was in more or less order.

No mines were then laid to the eastward or westward of the Barrage, and this left a gap for submarines to pass under. In this respect, it is an interesting fact that the tide sets stronger to the eastward than to the westward; but it could not be assumed that the mines would not drag to the westward, so no new mines were laid till sinkers which would not drag had been devised. This was taken in hand by the Mining School. The reason for laying the mines originally to the westward was that they were more protected against being tampered with by the enemy, as they were on our side of the net-line. Although it was rather an off-chance that the enemy would have the pluck to interfere, still there was the chance; and, had the mines not dragged, this was the correct position.

When the raid of October 27th, 1916, took place, evidence showed that the boats came from the southward of the Ruytingen, and did not cross the barrage line. I therefore

decided to continue the line right up to the Snou bank, but we had expended all available buoys. Admiral Ronarc'h, however, came to the rescue and got permission to weigh the navigational buoys on the Ruytingen and adjacent shoals, now no longer of use; and these, with others gathered together by the indefatigable Stores Department of the Admiralty, enabled us to go on. The difficulty of maintaining the half-a-mile stretch of nets between the buoys led to the Admiralty approving a double number so as to halve the distance between each. As these became available they were laid, commencing with the worst sections.

The problem of defending the Barrage, when laid, was not an easy one; it constituted a grave danger at night to the patrolling destroyers, and it was at night that the chief attacks were likely to be attempted. Light-buoys were, therefore, laid at every three miles to mark its position. It may be argued that this assisted the enemy, but in these matters there is always a balance of opposing disadvantages. It mattered not if enemy submarines did see the lights, provided that they dived into the nets. If the submarines passed on the surface, then an accurate knowledge of the position of the Barrage was of little value to them, but the immunity of our own vessels patrolling every night was of the greatest importance to us.

During the raid of April 20th-21st, 1917, in which the *Broke* and *Swift* engaged the enemy, the boats passed between the Northern light-buoy and the Goodwin Sands. This run-way was then stopped. The enemy made several attempts to sink the buoys, and on more than one occasion cut the jackstays of the nets. Their method of attack was to fire armour-piercing bullets into the buoys to make them leak, using surface vessels for this purpose, probably submarines or sea-planes. It was while doing this that the drifter with Lieutenant Bell Irving dropped on them and accounted for two sea-planes.

Gaps were left in the Barrage which were known only to

ourselves, and these were periodically changed in case information leaked out to the enemy. They were necessary to let out our own destroyers and also the monitors as an alternative route when bombarding the Belgian coast. Evidence gradually showed that submarines still passed—probably on the surface. Two of our submarines were, therefore, fitted with occulting lights on top of their conning towers, so as to appear at night-time to be merely ordinary light-buoys. These were moored after dark to mooring-buoys laid in the likeliest spots in the Barrage. I entertained great hopes that these would sink some of the enemy, but they were never fulfilled. Only on one occasion was an enemy boat sighted by them, and then, before our submarine could be turned to bring the bow torpedo-tube to bear—these submarines had no broadside tubes—the enemy was lost in the darkness. On one other occasion, in a mist, an enemy was heard, but not seen, so that the long night vigils brought no results.

There is no doubt that this Barrage never stopped submarines passing. Occasionally information was received that they had fouled the nets, and in one case that a boat was badly damaged by a mine but just crept home. There was also local evidence of the loss of two or perhaps three, but the submarines still passed; the dangers were too remote to stop them without mines to guard the lower part, and they were also able in a strong tide to pass on the surface. But this does not mean that the Barrage was useless. It was an undoubted deterrent to destroyers. In fact, we had unfortunate proofs of its efficacy in the accidents to more than one of our own boats. Attempts were made to improve its efficiency, so far as surface craft were concerned, by trying to moor nets stretched on the surface of the water to foul the propellers of surface craft. The first attempts aimed at tailing the net out from the jackstay of the vertical nets. This was disastrous, as at slack tide the horizontal net bunched up to the jackstay and the bottle-floats of the vertical nets toggled through the meshes of the horizontal nets and be-

came a veritable tangle. The nets were then stretched between the mooring-buoys for the vertical nets and a second lot of buoys parallel to the existing line. While these trials were in progress, 1917 came to an end.

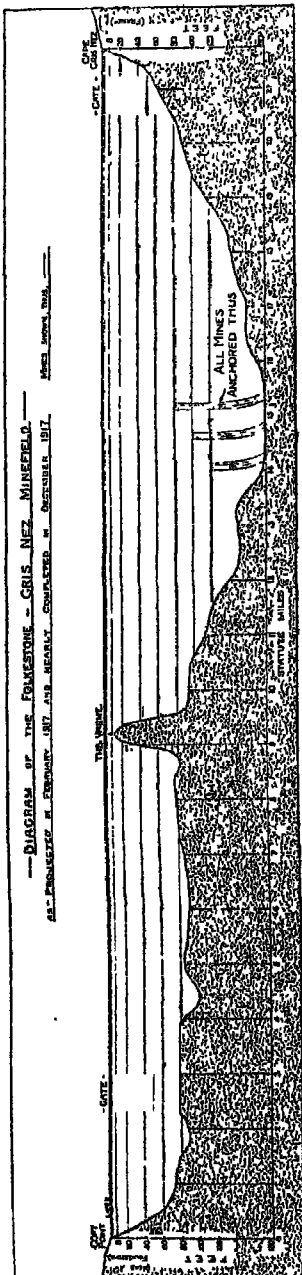
In 1916 I used mines at two depths to make a vertical screen or ladder for the Belgian coast, and in February 1917 I prepared a scheme of a ladder defence of mines for the Channel, which eventually stopped all submarines passing through the Channel. The reason for so doing was that it was becoming daily more apparent that nets would not stop submarines in the Channel, and that the only thing possible was a really good mine-field. No mines were, however, available, and a supply was not expected before the end of the year.

It is necessary, in laying mines, to lay them at some minimum fixed distance apart, on account of the effect of the explosion of one mine on the next one to it. This distance varies with the nature of the mine and its sensitiveness to the effect of a neighbouring explosion. It can easily be understood that if mines are laid too close together, and one explodes, a *feu de joie* of mines will be the result, each one setting the one next to it off, and so on in succession until the whole field is destroyed. Such an incident occurred, I believe, in the Heligoland Bight, early in the war. Now, supposing the required distance to be 150 feet, and the diameter of a submarine to be 20 feet, the only method of placing mines so that a submarine must hit a mine at any particular depth, is to have eight lines of mines all at the same depth, and all with their mines 150 feet apart. Each line is "staggered," so that, looking at the eight lines from a distance, a mine would be seen at every 20 feet. But this only holds good for one depth. If, as in the Dover Straits, the mean depth is about 18 fathoms, or 108 feet, five such groups of lines would be required, one 20 feet from the bottom, another at 40, and so on, to form a solid wall. From this rough description it will be seen that five sets of eight lines, or forty lines, would be required. As the Straits of Dover are approximately 18 miles across, a little

calculation will show that this meant about 28,000 or 30,000 mines. But so great a number was not necessary, since it was certain that if boats were sunk, one in every eight passages, *i.e.* in every four complete journeys, they would soon give up passing through. Two lines only at each depth were proposed, but it was hoped to increase this to four lines. Five depths were selected, about 4,000 mines being required. This I calculated gave an eight-to-one chance in favour of the submarine.

After discussing the various pros and cons with Sir J. Jellicoe and Sir H. Oliver in February 1917, the Folkestone to Grisnez line was chosen, and the scheme approved as soon as mines could be supplied. In time the Operations Committee began to get busy, and suggested a scheme for mining from Dungeness to the French coast with a line of patrol vessels to force submarines to dive. This was an absurd scheme from a practical point of view. The length of line chosen was needlessly, and at the same time hopelessly, long. I was strongly opposed to having the line marked by a patrol in the first instance, and also anxious to let submarines be destroyed without the enemy having the slightest inkling of how they were lost.

There was no objection to instituting a surface patrol if it was found that the enemy did not dive, but the difficulty of keeping boats in station at night was very great, though, of course, not insuperable. In September I heard that the mines would be ready in November, and the details of the scheme were worked out. At the suggestion of Sir H. Oliver, the portion of the Channel in which we were going to lay mines was re-surveyed, and the water re-sounded to make certain that no changes had occurred since the previous survey. The first operation was to lay four parallel lines from the N.E. Varne to the traffic route off Grisnez. It was quite a nice problem to lay these lines out of sight of land, and, as it turned out, on a misty day—especially as there were only sufficient vessels to lay two lines simultaneously; and the second two lines had to be laid on the return journey in a cross-tide, the lines



already laid having in the meantime become dangerous. Of course they were deep and well below the ships, but it would have been unwise to run any risk of a mine dropping on one previously laid. The mooring-ropes were cut to definite lengths to avoid any chance of error as to the depth of each mine below the surface. The orders were most detailed, and every precaution was taken to ensure the greatest accuracy in positioning each line.

Laying went on until the whole of the lines were completed, and this was nearly all done by the end of December. The accompanying plan gives a diagrammatic section of the mine-field. In this diagram the horizontal scale is in *miles* and the vertical scale in *feet*, so as to make it compact. Each dot represents a mine moored to the bottom. The lines of mines, of course, are not all in the same vertical plane, but separated at certain definite distances in the direction of the paper to admit of their being laid with safety, but the general effect is a wall of mines as shown.

The question of making the mine-field dangerous to surface-craft occupied much thought. Originally I had had hopes of

surface-nets, but the Goodwin-Dunkirk nets, and our experience of the mixture of nets and mines, had not been happy. The best policy, to begin with, was to let submarines sink themselves in the mine-field while diving, but inevitably the question of patrolling the mine-field would arise. The use of search-lights was a possibility, and was also of value, in that it indicated to the Patrol the position of the mines.

This necessitated the search-lights being operated from fixed positions. If permanent structures were used, the depth of water and the strong tide necessitated their being of very elaborate design. Ships could not be moored or lie at buoys, but light-ships already did so. So why not use light-ships? ¹ Four such ships, with a light at Folkestone pier and at Grisnez could illuminate across the whole Channel. I therefore put forward the proposal for four such ships, each to have four search-lights, working two fixed direction beams, one on each beam, and two wandering lights to sweep one to the eastward and one to the westward.

Another great advantage of thus mooring vessels was, that it gave an actual line across the Channel, to the eastward of which no patrol or other vessels were to be allowed to pass. This enabled a mine-field to be laid immediately to the eastward of the line of light-vessels—dangerous to submarines on the surface, and, therefore, of course, dangerous to our own vessels at low water. But direct orders were to have been given that no vessel was to pass between the direct Dover-Calais route and the Barrage line. This would have kept them well clear of the shallow mines. If a vessel infringed these, it would have been at her peril. On November 23rd I put forward the following additional proposals:

“Deep mine-fields fail usually from three causes.

“(1) The shallow mines have to be sufficiently deep to pass deep-draught ships; hence submarines can pass over them when diving.

¹ Light-ships are specially designed to ride to moorings in a heavy sea.

"(2) Routes passing over the line cannot be swept and so cleared of enemy mines. It is usual, therefore, to leave such routes free of deep mines, and this, in turn, leaves gaps in the defence.

"(3) Difficulty in ensuring submarines diving and in preventing them passing over the field on the surface.

"In the recent proposal these are guarded against in the following way :

"(1) For nearly three years passage to merchant vessels has been denied between Folkestone and Grisnez, except by two routes—one through Folkestone Gate, and the other within one and a half miles of Grisnez. It is, therefore, safe to lay mines within eight feet of low water ordinary springs across the remainder of the area.

"(2) If search-lights are provided at the points where the ship-routes cross over the deep field, enemy submarines working on the surface cannot lay mines at night, as the patrol vessels will prevent this. If they lay mines while submerged they will run the chance of getting into our mine-field. Hence these portions of the trade routes may be looked on as immune from mine-laying, and need not be swept.

"(3) If continuous beams are kept up across the Channel, combined with wandering beams and patrol vessels, submarines cannot pass on the surface without attack and must therefore not pass, or must dive.

"The general scheme, therefore, is :

"(1) Extend the present deep mine-field from the French to the English coast.

"(2) Lay a double line of mines, eight feet below low water ordinary springs from one mile S.E. of Folkestone Gate to two miles N.W. of Grisnez, flanking the N.E. limits of the deep mine-field.

"(3) Provide three search-lights each at Folkestone and Grisnez, one being a fixed beam and two wandering beams.

"(4) Provide three shallow-draught small vessels with bulges and moor them on the principle of light-ships to divide the distance across the Channel—each to have four search-lights, two 12-pounders, or 4-inch guns, and two 8-inch howitzers (short range).

"The search-lights will be used as follows : each ship will throw two fixed beams, one N.E. and one S.W., to meet those

of the next ship. The other two search-lights will sweep the N.E. and S.W. segments.

"These sweeping beams should show up and follow any enemy boats for the patrol-boats to hunt and force under water. The search-lights should show up to the patrol-boats all submarines which are on the surface up to a distance of three miles from the source of light. The 12-pounders, or 4-inch guns, are for the protection of the light-ships in daytime. The 8-inch howitzers with time-fuse H.E. shells are for protection from bombing at night. These ships should have bulges—it is always of such importance to frustrate a first attack on the part of the enemy; a first success means repeated attempts, while a frustrated attack will probably not be persevered in.

"Four ships, if available, would be better than three.

"The patrol vessels will vary their patrol to keep clear of the shallow mines at low water.

"They should, however, be able to pass over them at all tides except in a sea."

About this time a Dover Barrage Committee was appointed by the First Lord of the Admiralty. It was, of course, highly desirable to bring all the expert engineering skill available to bear on the possibility of building a permanent obstruction across the Channel, and an Engineering Committee would have been most valuable. But to attempt to run a mine-barrage from the Admiralty with naval officers who knew nothing about the practical work at Dover, and the general patrol details from Nieuport to the Downs, was of course absurd. It was, again, an example of how little experience was recognised and valued by some of those at the Admiralty at that period. The inexperienced rarely appreciate the value of experience.

The Barrage Committee visited Dover and saw everything, and then returned to the Admiralty merely to become a fifth wheel. Questions which previously had been settled between the Sea Lord concerned and myself now went to the Barrage Committee. Take, for example, the moorings of the light-

ships. I was anxious to get these at an early date. On December 12th I telegraphed for details, asking when they would be supplied, and was told that the Barrage Committee had them in hand. In the old days a visit to the Varne Lightship, and an inspection of her cables, an expert opinion from Trinity House, a visit to the Director of Stores, Admiralty, and the Fourth Sea Lord would have settled the matter—two days' work only. When I left at the end of December the Barrage Committee were still apparently considering the matter.

There was a tendency for this Committee to try and regulate the patrols in the Straits. As they had neither experience nor responsibility, Sir John Jellicoe, with the good sense bred of his great experience, refused to countenance such an absurdity; but, in spite of this, minor interferences crept in. On December 15th, in answer to certain correspondence, I wrote as follows:

“I am again increasing the patrol drifters, at all events temporarily, by one division.

“The Folkestone Gate trawlers look out for the water inshore of the Gate, and the French supply two trawlers for the water close to Grisnez.

“This leaves me two divisions for the Goodwin nets, which are most important for defending the Downs, and one division for Dunkirk.

“During the day-time I have now one division of drifters, which I am increasing to two divisions, patrolling the mine-field, and, when weather permits, a constant air-ship patrol covering two miles each side of the mine-field.

“Alterations of this nature in a patrol must be gradual to avoid confusion and accident.

“It may seem simple to effect them, but it is not. Advantages and disadvantages have to be weighed, and ideas occur in development.

“It is as well in war-time to avoid making mistakes, and the dispositions of a patrol of this nature in close proximity to the enemy are complex.

"For instance, the question of the Dunkirk drifters is closely linked with the defence of the P.-boats and 30-knotters from the Zeebrugge destroyers.¹

"So long as I can keep the nets and mine-field off the Belgian coast efficient the German destroyers must pass close to West Capelle, and a force at anchor off Dunkirk is a potent threat to their return route.

"If, however, the nets are allowed to get into disrepair, as now is fast becoming the case owing to failure of supply of net-mines, then the enemy can return anywhere between the Clif d'Islande and West Capelle; his return course cannot be localised, and a force at Dunkirk is useless.

"A force at Dover is useless to prevent a raid unless kept underweigh.²

"It is impossible to get a force out of Dover at night and across the Straits to stop raiders, or in time to engage the enemy before he clears out, if the first warning given is the attack on the mine-line.

"I cannot keep more than a certain percentage of my destroyers underweigh night after night, as the captains cannot stand the excessive strain of too much day and night work.

"A force at anchor at Dunkirk not only rests the boats, but is a bigger deterrent to a raid on the Straits than a similar force at Dover.

"I have gone into this explanation of a single detail to point out that I have a reason for all my dispositions, which may not on the face of them be apparent.

"I know the wishes of their Lordships, and it is needless to say that I will carry out these wishes whole-heartedly, and at the same time provide as best I can for the safety of the Straits; but I must have latitude in my dispositions, and I must vary them as necessary; and I submit that, having expressed their wishes, their Lordships should leave the executive dispositions of forces to me, and to vary as I consider necessary.

[Just fancy an Admiral in command in war-time having to

¹ On the Folkestone mine-field.

² Underweigh means with anchor up. Under way means with speed on the ship.

write in this strain to the Admiralty to answer the meddlings of an irresponsible Committee! I then continued further explanations for the benefit of the Committee.]

"I submit the present state of the mine-field is not appreciated by their Lordships. In the letter under reply, in paragraph (1) it is stated that twenty-one submarines have passed through the Straits *since the deep mine-field was laid*. I suggest it is intended to mean—since the deep mine-field was commenced.

"The mine-field is not yet completed, nor will it become a really effective danger to submarines for some weeks to come.

"On 12th instant I telegraphed asking for details of the moorings of the light-ships, and was informed that the Dover Barrage Committee had these under consideration. I would be glad of an early decision and supply, as these should be laid, if possible, before the more shallow lines, otherwise the light-vessels will be at the edge, and not within the mine-field, which is the better position.

"The treatment of the two trade routes requires separate consideration. The portion each side of the Folkestone Gate can be filled in and made good, but the route through the Gate itself and the French coast route will require special thought. However, if the mine-field is completed up to these two points, a considerable security will have been gained.

"When this will be done it is difficult to say, as, now that H.M.S. *Princess Margaret* has left, the work has to be carried out by the *Paris*, carrying 79 mines, 4 trawlers each carrying 25 mines, and 4 destroyers each carrying 40 mines, or one complete laying of 339 mines or 11 miles. The work is being pushed on at this end with vigour. The distance to be completed will be about 40 miles, or three layings, and, allowing for weather, will take about three to four weeks; but this again is dependent on receipt of moorings for the light-ships.

"To accelerate this laying I would be glad—

"(i) Of the moorings for light-ships.

"(ii) Of approval—if approval can be given—to lay the line eight feet below L.W.O.S.

"(iii) Approval to lay all lines up to the Gate.

"In addition, I submit for approval, to continue this mine-

field from the Northern light-vessel to Copt point, and to close the east approach to Folkestone except through the Gate.

"It is fairly certain that if submarines desire to pass the Straits, and if they know that the main portions of the waters are dangerous, they will probably use the traffic routes.

"This can be guarded against in two ways :

"(i) By the use of electrically controlled mines in conjunction with hydrophones at Folkestone Gate.

"(ii) Making a sharp bend in the trade route at Grisnez and buoying this and using it only in day-time for traffic.

"I have been having trials made of a surface obstruction which can be fitted to carry explosive charges. This has given promising results, and, if further trials are satisfactory, will be a valuable addition to the mine-field.

"I do not propose to abandon either the Belgian coast or Dover Straits Barrage, or the Goodwin nets, and I am eagerly looking forward to a supply of net-mines to keep them efficient.

"I see no reason why all this work, together with the mine-field patrol, should not go on simultaneously. To abandon any of these would leave a bad gap in our defences.

"As regards paragraph 5 of the letter under reply, I do not consider it advisable for the drifters to use flares except in case of submarines being sighted. To do so would be to give away their position at a considerable distance to the submarines, who would avoid them.

"At present the system of defence is to keep the drifters well out of the area where the water is illuminated by the search-lights and submarines can be detected if on the surface.

"It must be remembered that drifters will not keep their position accurately, and gaps will occur, however many drifters are used.

"The skipper of a drifter is accustomed to drift, and not to preserve station at night. If flares are continually used these gaps will become apparent, and the partially submerged submarine can sneak through.

"If the water is sufficiently illuminated by search-light, the flare, except to verify some suspected object, is redundant.

"A submarine is more likely to be detected and hunted into the mine-field if the patrols can be kept as invisible as possible.

"The enemy will be certain to try and stalk the 30-knotters,

and it is therefore essential for the patrols not to be too close to them, so that the submarines can be silhouetted against the beam and the alarm given.

"As regards the covering force of destroyers, these again are silhouetted against the lights, if too close, and form an easy prey to the enemy if they raid. For this reason I have been obliged to move them to the vicinity of No. 5 net area buoy.

"The whole matter is one of compromise and difficulty, and must be run on practical experience, and not on preconceived notions.

The above statement put, as politely as I possibly could, the obvious fact that it was better to leave the defence of the Straits to the Admiral who had local knowledge, experience, and the whole responsibility entailed by the command at Dover, than to allow dabbling by a committee who had no local knowledge, experience, or responsibility.

It was such foolery ! There was I, with a possible destroyer raid at my door, the Downs to protect, the French coast to keep from molestation, and there at the Admiralty was an irresponsible committee, trying to get orders given to me as to how I should dispose my patrols to suit their theories. Thank goodness, we had a First Sea Lord who was a seaman of experience ; but I imagine, from events that happened shortly afterwards, that his work was not made easy for him.

Now the instructive part, to guide future action, lies in the sequel. After Vice-Admiral Sir R. Wemyss and Rear-Admiral Roger Keyes succeeded to the responsible positions of First Sea Lord and Admiral of the Dover Patrol respectively, they were able to put in force the systems of Patrol which they had tried to get Sir J. Jellicoe to dictate to me. Within six weeks the Germans raided the Barrage and sank or badly damaged fifteen vessels. It was an intensified October 1916 raid, with the difference that more vessels were lost. There was the experience gained from the previous raid to guide defensive action and prevent such a second raid doing appreciable damage ; our drifters in 1918 were fourteen miles

further down channel than in 1916, and therefore in a more easily defended locality, and lastly, the force of large destroyers available for the defence of the Straits was nearly double what it had been at the time of the previous raid.

No assistance was sent to the patrols; the enemy's vessels arrived, ran amok and sank as they wished, and left without a single shot from a large destroyer being fired at them. Let it be distinctly understood that the *prevention* of the raid was entirely a matter of luck owing to darkness and the large area of the Straits. No ordinary dispositions could have prevented it taking place; but to nip the raid in the bud was a comparatively simple matter. Experience both of the locality and of the psychology of the enemy would have indicated the dispositions necessary to effect this. But as might have been expected the theories of the Barrage Committee scarcely worked out in practice. I wonder if this loss of ships and life led the First Lord of the Admiralty to appreciate even slightly the value of experience to an Admiral in command, and that responsibility attaches to arbitrary changes in high commands.

But to return to the project I set out to describe. After discussion, Sir J. Jellicoe approved the proposals. The laying of a shallow mine-field was not viewed by all with favour, but it was out and away the best thing to do. It was much better than the flares subsequently adopted, which were, in my opinion, quite a wrong thing to use. The scheme then would have been one of a shallow mine-field in the middle of the lines of deep mines with the search-light ships moored with permanent moorings in the line of the shallow mines, the latter being in the fixed beams, and the patrol always lying to the westward of the Barrage with a destroyer patrol well to the eastward and one spread to westward along the barrage-line. This would have been a very serious menace to the enemy submarines and no real danger at all to our own craft. In fog, the ships would have had orders to steer four miles to the westward and lie clear of the cross-Channel traffic.

These dispositions, in my opinion, would have stopped submarines passing considerably earlier than September 1918.

It is understood that, because our vessels were allowed to stray over the 20-foot mines while a sea was running and accidents occurred, the 20-foot mines were swept up later on, and the 8-foot mines were not laid. This, in my opinion, was a retrograde step, and delayed the final stoppage of the submarines. I knew that I could prevent our own or other vessels straying into the shallow mine-field, so that I was quite deaf to all remonstrances. Dover was a rare school for teaching how to discard objections to new schemes.

This was the second example of how plans which were originated and evolved with great thought and consideration based on nearly three years' command at Dover were altered after I had left, and reduced in efficiency through the inexperience of those new to the practical conditions existing in that area.

The laying of the shallow mine-field between the light-ships would have effected two purposes—the first to mark this line, which was dangerous in most tides, and the second to mark accurately *its position when it had to be renewed*. In case of fogs, the patrol would, in any case, have been useless, and would have been withdrawn three miles to the westward. At night the search-lights, and in day-time the light-ships, would have marked the eastern extreme of the safe waters for the patrol vessels. The supporting destroyers would have been partly to the westward and close up to the line of patrol drifters, and partly to the eastward of the mine-field, with a light-buoy, approximately in the centre of the Channel, to guide the latter.

It was only experience of the Dover area that could invest an Admiral with sufficient authority definitely to settle the point as to whether it was safe or not to lay the shallow mines. I fully appreciate the action of my successor in abolishing them, as he could not settle the matter from extensive experience of the Straits, his only knowledge being that

gained at the Admiralty as President of the Operations and Barrage Committees. As in all other matters, common sense and experience have to decide against the balance of opposing evils.

The argument that a sailing ship might drift into the mine-field in a gale and get blown up was advanced. This was possible, although only one had been in that area for two years. Well, the answer was, "I am sorry, but if she is blown up, it is better to lose her and stop the submarines passing and sinking steamers down west." As regards our own vessels, I had no compunctions whatever. The area was practically never used by them, and they would have had no difficulty in giving a wide berth to the places where it was intended to lay the mines. I told the captains of the patrols to let their skippers know that they *were* to keep clear and that they would get no sympathy from me if they were grossly careless and did not do so.

Such is the history of the initiation of the Folkestone Barrage—the last constructive work done in the Dover Patrol before the armistice. On December 19th, before the Barrage was anything like complete, we got our first submarine.

The main morals to be drawn are—first, to go for the best weapons (in this case, mines), and not to burden the decision by restrictions such as vetoing the use of electricity, etc. Had we had good mines at the commencement of the war, we should have seen the last submarine pass down the Channel in May 1917. The second moral is this—if you wish your country to win in war, do not allow committees to spring up at the Admiralty, *and exercise semi-executive functions* in particular localities without responsibility or experience. Their sole utility can only be to force any self-respecting Admiral to resign his command. This is undoubtedly what would have happened in my case after Sir John Jellicoe's firm hand and wisdom were removed from the control of Naval affairs at the Admiralty.

THE DOVER STRAITS ROULETTE

Sec hidden in the muddy tide 'twixt Folkestone and Grisnez,
Mines in their thousands, floating, bar the underwater way.
Blood-red the mines are painted, and the water black as jet—
Both *Rouge et Noir* assembled for the Dover Straits Roulette.

"*Messieurs, faites vos jeux,*" each time Black Death, the croupier, cried
To every German submarine that dived beneath the tide.

"Come! *Rouge et Noir* the hazard, and your life or death the bet,—
In fateful submerged gamble with the Dover Straits Roulette."

Ab! Passe ou Manque? Which is it, as they near and nearer creep,
While visions of their life-time pass like fleeting dreams in sleep?
The gibes of murdered crews prevent all strivings to forget
That *those* deaths may be their death in the Dover Straits Roulette.

"*Rien ne va plus,*" the mines are close, "*Messieurs, le jeu est fait.*"
The croupier grasps his scythe to reap whatever stakes he may.
Weird tension grips their beating hearts and holds their jaws hard set,
Rouge gagne? Rouge perd? Hell's gates loom through the Dover Strait
Roulette.

CHAPTER XV

THE DRIFTERS AND THEIR TASKS

Early history of the drifters—Description of drift-nets to catch submarines—Difficulties encountered—Use of mine-nets—The Zeebrugge Zaireba—The Ostend bombardment—Work in West Deep—*James Fletcher* rams a submarine—Laying the barrage off the Belgian coast in 1916—The loss of the *Clover Bank*—The adventure of the 9th Division—Capture of the *Au Fait*—The Goodwin-Snou barrage—The raid of October 1916—Gallant behaviour of the drifters—Engagement with sea-planes—Salvage operations—Laying the 1917 barrage on the Belgian coast—Work on the Folkestone mine-barrage.

Not merely a niche, but an ample shelf in my memory is reserved for the Dover Drifters—gallant little craft, practically unarmed, yet ready for anything. They were just as happy shooting their nets off Zeebrugge during a bombardment as drifting nets in the Channel. They were always at the mercy of the enemy's destroyers, trusting merely to the support—often quite illusory support—of other vessels. This chapter will give an account of some of their experiences. I have delayed doing so until after the description of the various barrages had been completed in order that their work might be more thoroughly grasped and appreciated.

First, however, it is necessary to give some details of their equipment, so that terms which will subsequently be used, such as "drift-nets," etc., may be understood.

The vessels of the Dover Drifter Patrol formed an organisation apart from those used to protect the shipping off Ramsgate in the Downs. The first of the former vessels arrived at Dover on January 4th, 1915, and were under the able command of Captain Humphrey Bowring; afterwards, when this officer

became my Chief of Staff, he was succeeded by Captain F. Bird, an ideal officer for the work; he was always cheery. By June 1915 the Patrol had reached its maximum strength of 132 drifters and 3 yachts, manned by upwards of 1,500 officers and men, disciplined and ready for any work, of whom less than a dozen had belonged to the Royal Navy six months before.

The anti-submarine measures employed were an entirely new branch of naval work, and all the adjuncts, except the actual nets, underwent many changes in design and application, the result of much bitter experience and disappointment.

The elementary idea of submarine-hunting was that a submarine should be caught in a net in much the same way that a rabbit is bolted into a purse-net, and then despatched, the torpedo-boat destroyer taking the place of the keeper in the final act. Unfortunately experience showed how primitive this idea was, and the hundred-and-one difficulties unforeseen, but discovered in netting such big game as submarines, necessitated very wide departures from the original ideas. So that, from the arrival of the first net at Dover until the conclusion of the Patrol's operations on the signing of the Armistice, the development of method and material was unceasing.

The nets were made of thin, galvanised, steel wire, the size of the mesh being from 10 to 12 feet. Each net was 100 yards long, and the patterns varied in depth from 30 to 120 feet, according to the situation in which it was to be used and the consequent depth of water that it was necessary to protect. The cost of each net was from £8 to £16, according to the size. The normal equipment of each drifter consisted of ten nets, making a "fleet" 1,000 yards in length. Light as these nets were, they were extremely strong, but were not, of course, capable of arresting a submarine having a dead-weight of anything from 300 to 3,000 tons. Consequently methods had to be devised whereby the nets could be drifted

in a desired position, but would also, instead of being torn, envelop an enmeshed submarine, indicate on the surface its position, and travel through the water with it until a favourable opportunity occurred to destroy it. These apparently simple conditions, however, opened up a mass of problems, some of which were never satisfactorily overcome, whilst others were so successfully tackled that the methods employed fell little short of perfection.

The first problem was to float the nets. At first this was effected by the employment of a vegetable substance called kapok, a product of the West Indies, which has been made familiar to the public by its use in various life-saving appliances. This material has great properties of buoyancy for periods of many hours or even days if treated with reasonable care. Kapok is composed of an accumulation of vegetable hairlike tissues, a microscopical examination of which reveals the fact that each tiny hair is hollow, and that its buoyancy depends on the minute amount of air enclosed in each tissue. It is evident that, to preserve the buoyancy, it is of the greatest importance that the hairs should not be crushed so as to expel the air, but unfortunately working conditions proved this to be impossible. The method of employing kapok was to stuff a light canvas hose, about three inches in diameter, with the material, and the hose was then secured along the head of the net. This method entailed a very large amount of work, and also great care in handling, and even then it was found that, after the incessant immersions and handling, inseparable from the constant employment of the nets in the anti-submarine campaign, the kapok became saturated, lost its buoyancy, and allowed the net to sink.

After persevering for many weeks and losing many hundreds of nets, kapok was abandoned, and other means of flotation were tried. Various methods, such as corks, sealed tins, etc., were experimented with, and finally a solution of the difficulty was found by the employment of hollow glass balls. These proved excellent. The glass balls were inserted in net-bags

made of coarse twine, and stood a surprising amount of hard usage; the bags were then secured to the head of the net. A net 100 yards long and 30 feet deep required about 150 balls to float it effectively. The difficulty, however, was to obtain an adequate supply of these glass balls, and, owing to the low state of the British glass trade, and the many other calls on that industry, these floats had to be procured at high cost from Norway. Later on, ample supplies were obtained in England, but in the early days deficiencies of supply frequently held up the work of the Patrol.

The problem of floating the nets having been successfully overcome, the next important point was to secure the nets so that they would remain in place under reasonable conditions of weather and tide, and yet not be so securely fastened as to allow a submarine to tear through the net and escape, but to ensure that any submarine enmeshed would pull the net away from its moorings and be enveloped in it. This was accomplished fairly satisfactorily by employing metal clips to secure one net to another at intervals. The clips were designed to break under a strain of about one-half of that required to tear the net.

But the most difficult problem of all, and one which was never successfully overcome, was to find a buoy, or float, which could be attached to the net, and which would indicate its whereabouts when the net was taken away by a submarine, however deeply she might dive. This buoy was known as an "indicator buoy." It had to be capable of showing a light at night when it was carrying out its functions; it had to remain quiescent under all conditions of wind, weather, and tide; and it had to function when required to do so by the presence of a submarine in its net. Perhaps it was expecting too much to try for a hurried solution of these conditions during war-time. At any rate, designs by the dozen, and suggestions by the hundred, were received, tried, and abandoned, and it must be acknowledged that to the end this problem baffled all efforts at its complete solution.

Such were the appliances which the drifters, day after day, and night after night, used in the Channel; shooting their nets on a line between the Goodwins and the Ruytingen when the tide was running to the westward, and drifting down slowly with it till abreast of Folkestone and Grisnez. Then the nets were hauled on board, re-shot on the east-going tide, and the whole were drifted back again. Occasionally a net would be fouled, bringing every destroyer to the spot to hunt for the float which indicated its position and drop charges to destroy the suspected submarine. These alarms were frequent, and were generally the result of agents other than submarines; but, even so, they were causes for excitement in what otherwise was a prosaic method of passing month after month.

Many minor improvements of the gear were made and employed, but without doubt the most successful adjunct to the nets was the "net-mine," invented by Admiral of the Fleet Sir A. K. Wilson, V.C. This electrically-fired mine proved of immense value, and completely revolutionised the method of employing the nets. It was really the combination of two instruments of destruction deadly to submarines—the net and the mine.

A mine when laid in the ordinary way—that is, moored to the bottom of the sea by a rope—only guards a space equal to its own dimensions, about 3 feet by 3 feet, and a vessel can pass within a fraction of an inch above or below, or to either side of it, with perfect safety. The use of a mine whose area could be extended to that occupied by a net, and which could be fired automatically, increased the value of the mine immensely, for, when a net enveloped the submarine, the mine was brought, with more or less certainty, into contact with her hull, with the consequent destruction or serious damage to the vessel. The only disadvantages were, first, that the mine was equally dangerous to our own craft, if, from some cause beyond their control, they got into a dangerous area and fouled the nets, and that, secondly, electric firing was

necessary, with its accompanying troubles with batteries and circuits. It was largely for this reason that the system hitherto followed, of employing drifters attached to a "fleet" of mine-nets, which drifted with the tide, was abandoned, and a system of mooring the nets to the bottom was instituted, and became almost universal. The successes were many, but it was often impossible to tell for certain if a submarine had been destroyed, for the mines were frequently fouled and fired by whales, thrasher-sharks, and other large fish, besides being struck by drifting wreckage, etc. However, conclusive evidence of success was more than once obtained by the sudden appearance on the surface of a dead German sailor, caught amongst the remains of a net which was being hauled in for repair or overhaul. But the chief claim to success was the immunity which was enjoyed by the English Channel from the presence of mine-laying submarines for many months after the institution of the mine-net barrage on the Belgian coast in 1916, which is referred to elsewhere in this narrative.

In the summer of 1915 our progress in long-range firing had been sufficient to make the bombardment of Ostend and Zeebrugge possible, and preparations were pushed on to commence active work. The reception we would receive off these ports was, of course, entirely a matter of surmise; but it was wise to assume that it would be much the same as that with which we would have favoured German ships which might have attempted to bombard Dover. Submarine attack was the most deadly peril. Hence every care was necessary to protect the bombarding fleet from these pests. I determined to take drifters to shoot nets round the vessels while bombarding. It was not the most comfortable of all solutions, as I had to traverse the North Sea at night with vessels not accustomed to sail in company, and quite incapable of defending themselves, so that a determined destroyer attack would have been a serious matter, possibly developing into a disaster. However, after weighing carefully the pros and cons, and having the greatest belief in doing what the

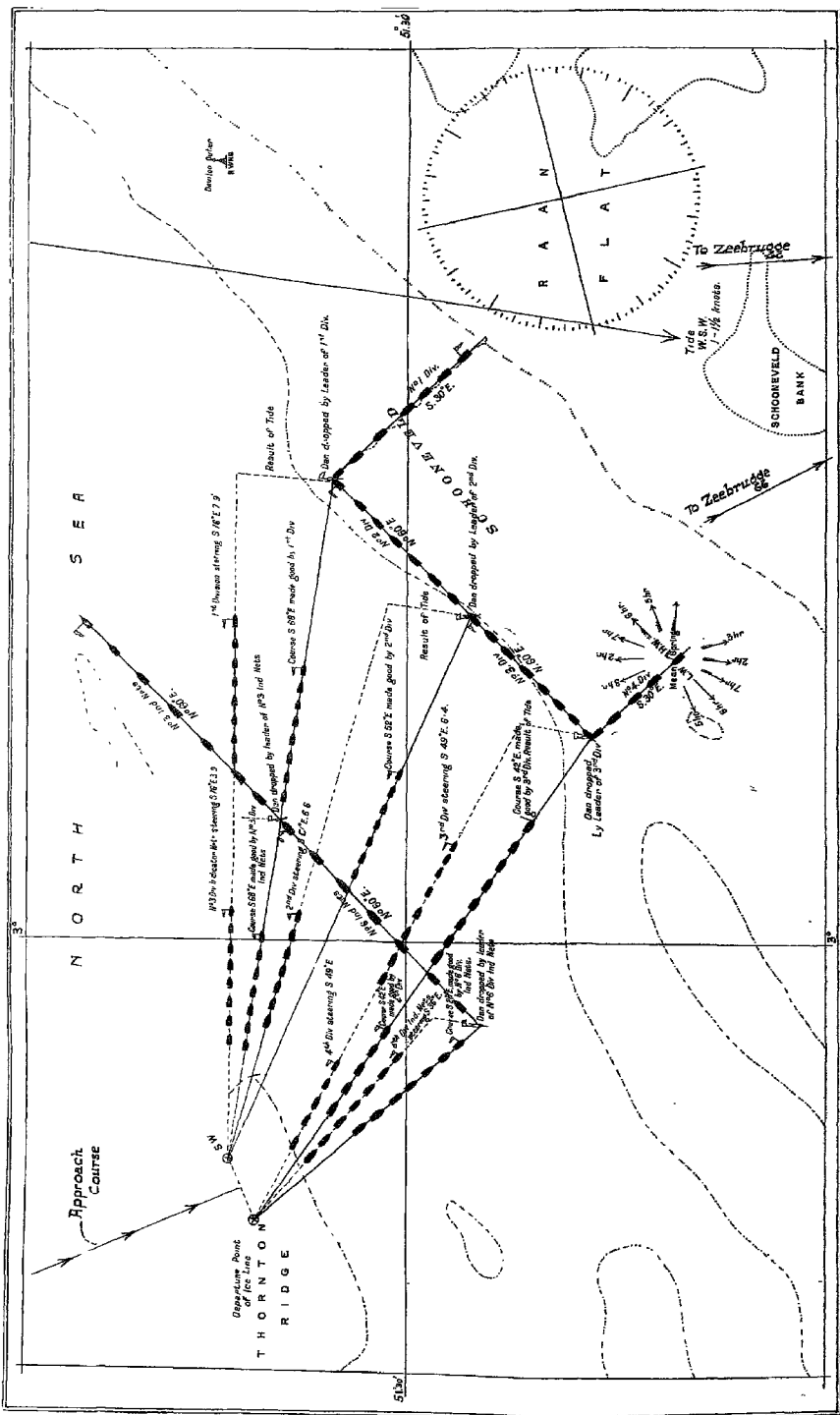


CHART OF BARRAGE OF NETS LAID BY DRIFTERS TO PROTECT THE FLEET DURING THE BOMBARDMENT OF ZEEHRUGGE, AUGUST 1915.

enemy would consider as improbable, I determined to take sixty drifters with me. I instructed Captain Bird accordingly. He, with his usual energy, trained his vessels to sail in company, to work in formations and to shoot their nets to form a zareba with reasonable accuracy.

To get the drifter's "fleet" of 600 yards of nets, with explosive mines in them, shot in a correct position, as regards each other with no overlaps, or gaps for submarines to pass through, was by no means an easy job, particularly for fishermen practically untrained in such an operation. It was, therefore, necessary to have several practices. Everything was carefully worked out by courses in degrees, and by seconds of time, and a considerable period was spent with blackboard and chalk, working out with the skippers concerned exactly what they had to do. The operation was practised four or five times at sea under the direction of the captain and commander of the Drifter Patrol. As it was most important that no information as to what was intended should reach the enemy, and as, with such a large number of people concerned, it was impossible to prevent talking, everything was worked out and practised on the assumption that it was intended to use the system to wall in an enemy submarine when discovered in the Channel.

The first start with the fleet was made on August 21st, 1915, but the vessels carrying the observation tripods¹ knocked about so badly in the sea that the attempt had to be given up. The next night, however, a second start was made. The nets were shot off Zeebrugge, as shown in Plate LXVII. It was quite a respectable manœuvre for any vessels to carry out.

On September 6th a similar number of drifters assisted at the bombardment of Ostend, where they had their first experience of being under heavy gun-fire; they were also liberally bombed. It must have been a queer baptism for them. They were suddenly withdrawn from one of the most peaceful of avocations, and then thrown into the hurly-burly

¹ See page 78.

of a bombardment, shells screeching overhead and bursting on the water, bombs falling unpleasantly close; and all the time those fishermen were tied up to their nets, which they would have to "board" when they were ordered to, and which it was almost a point of honour not to abandon in retreat. And never a weapon except a rifle to get something back with out of the enemy! They did very well, and said they enjoyed it.

At the same time that Ostend was bombarded drifters were helping to protect the *Redoubtable*, which was engaged in firing at Westende from West Deep. Here the *Violet II*, attached to the tripods, did well under quite heavy 6-inch gun-fire in saving the instruments, and towing and capsizing the tripod to prevent the enemy subsequently examining it. Afterwards the drifters were continually used to protect the ships during the bombardments of Westende and Middelkirke.

On September 23rd when H.M. the King inspected the Dover Patrol, the drifters of the Patrol were anchored in three long lines off the dockyard wall, the crews being paraded ashore for His Majesty's inspection. The drifter *Glover Bank*, with her nets and all gear complete for shooting, was moored alongside the wall for the King's inspection. The King went on board her and inspected the gear, and went down to the after-cabin with the skipper, making himself thoroughly acquainted with the life and work on board.

The next operation in which the Drifter Patrol was engaged was a double one, the Patrol leaving Dover on September 24th, 1916, in two sections: one to accompany the monitors, *Prince Eugène* and *General Craufurd*, to bombard Zeebrugge, and the other to accompany the remaining monitors to bombard Ostend. The first section consisting of the first division under Lieutenant Godfrey, R.N., in the *Ma Freen*, and the second division under Lieutenant Crafter, R.N.R., in the *Herring Searcher*, with the yacht *Sanda*, Lieutenant-Commander Gartside Tipping, R.N. The whole force was under Commander Venn, R.N.R., in the drifter *Cosmos*.

When about two miles off the eastern entrance of Dover harbour, the drifter *Great Heart* struck a mine and sank with the loss of Skipper William Davidson and seven hands killed, two also being injured. The drifters *Shipmates* and *Begonia* returned to harbour with the survivors, reducing Commander Venn's mine-net boats from twenty-two to nineteen.

On September 25th at 6.50 a.m. the mine-net boats shot the nets in accordance with their orders, the monitors shelling various targets and gradually closing to the south-westward. At 9 a.m. the enemy opened fire on the monitors from heavy batteries. All previous firing appeared to have been from lighter guns and fell very short. At 9.15 a.m. the yacht *Sanda* was struck by a heavy shell, probably 8-inch, near the deck-house below the bridge. The ship was very much damaged, and commenced to sink at once. All the executive officers were killed, and out of the total company on board—twenty-six—only thirteen were saved by means of her own boat, and the assistance of the drifter *Fearless*—Skipper James Beck—who at once slipped his nets and proceeded alongside the *Sanda*, taking three men off her quarter-deck, picking up her boat with six men, and rescuing from the water four others, who were placed on board the mine-sweeper *Marmion*, which then rejoined the monitors.

After the *Sanda* was sunk the monitors withdrew to the north-west and again opened fire, the drifters remaining in their previous position. At 10.20 the drifters were ordered to board their nets and reform, and the squadron proceeded to the westward. Whilst boarding her nets the drifter *Hyacinth*—Skipper Lawrence Scarlet—which was the next boat to the *Fearless*, was shelled by what appeared to be 6-inch projectiles, fifteen rounds being fired at her and straddling her so close that they threw the water on board her. Notwithstanding this, the skipper and his crew stuck to their work, boarding all their nets and mines before leaving, for which gallant conduct Skipper Lawrence Scarlet afterwards received the D.S.C., and his mate, T. J. Prior, the D.S.M.

This was the first occasion on which the Germans scored a hit on the Patrol, and the behaviour of the drifters *Fearless* and *Hyacinth* was in every way in accordance with the best traditions of the sea service.

On the same day the second division of drifters, under Lieutenant-Commander Boothby in the *James Fletcher*, the third division of drifters under Sub-Lieutenant Watson, R.N.R., in the *Devon County*, and the fourth division under Sub-Lieutenant Comby, R.N.R., in the *Reward*, with the drifters *East Briton*, Sub-Lieutenant Evans, and *S.D.F.*, Sub-Lieutenant Tanner (the whole force being under command of Captain Bird in the *James Fletcher*), left Dover for Dunkirk and West Deep.

At 7.35 the monitors opened fire, firing 102 rounds 12-inch, and 17 rounds 15-inch at Westende batteries. At 1.20 p.m. the force returned and anchored in Dunkirk Roads, where the detached monitors and drifters rejoined.

At 4.30 a.m. on September 26th the drifters again proceeded into West Deep with the monitors, taking station ahead as before, to patrol and guard them. At 12.19 the *Sir John Moore* and *Prince Eugène* opened fire and fired forty-eight rounds. At 1.25 p.m. on the following day the drifters weighed and proceeded into West Deep as before with the monitors. At 3.50 operations ceased, and they commenced to retire. At 4.6 the enemy opened fire on the retreating monitors, firing over the rear drifters, which then proceeded to retire north-west. The enemy fired nine rounds and then ceased firing, the monitors being out of range.

At 8.45 a.m. on October 2nd, the third and fourth divisions of drifters, with the *James Fletcher*, weighed and proceeded with the monitors into West Deep, and took station ahead as before. At 11.50 the monitors opened fire. A large hostile biplane attacked the *Marshal Ney* with heavy bombs. At 5.10 the firing ceased and at 6.45 the boats anchored off Dunkirk.

At 9 p.m. on October 2nd the drifter patrol weighed and proceeded in company with the monitors through Dunkirk

Roads, Zuidcoote Pass, and over the Smal Bank, anchoring off Zeebrugge at 6 a.m., where they formed a square round the monitors, who shelled various shore targets, firing fifty rounds; the enemy made no reply. At 6.40 the drifters reformed, and in company with the monitors returned to Dover.

Such were the little outings of the drifters off the Belgian coast. They were by now getting hardened warriors.

On October 31st I regret to say we lost the Patrol Yacht *Aries*. This yacht was on patrol in the vicinity of the South Goodwin Lightship. She saw the s.s. *Toward*, of the Clyde Shipping Company, blown up, and proceeded to her assistance with three divisions of drifters who were coming off patrol. Lieutenant-Commander Caulder, in charge of the *Aries*, had ordered the trawlers to take the survivors of the *Toward* to Dover, the three divisions of drifters returning to harbour. Observing what he believed to be an enemy mine inshore of him, he steamed towards it to destroy it. In so doing, he must have bumped another mine somewhere under the bridge, which caused the vessel to break in two, and to sink in about a minute. The commanding officer, four officers, and seventeen men were drowned; one officer and four men were saved, two of the latter having broken ribs.

One of the greatest difficulties in dealing with these gallant fisherfolk was to impress thoroughly on them the foolishness of taking a vessel to the assistance of a ship that had been mined, since one mine invariably meant several others near by. The orders were to send boats to rescue the crew, but never to approach in a vessel until the tide had drifted the mined ship well clear of the spot where she had been mined. The fellowship of the sea, however, often led to gallant but unwise actions. Of course, from the Admiral's point of view, no captain has the right, out of mere gallantry, to risk unduly his vessel. He may risk himself: that is his own look-out; but his vessel is a valuable asset to the country, and its safety should be secured against mere impulse. But it is useless talking about such things. You can inveigh about the loss to the

country and admonish, but at the same time it is impossible for any sea officer, at the bottom of his heart, to condemn such deeds.

Early in January 1916 the *James Fletcher* had a stroke of good luck. When patrolling at night off the South Goodwin she rammed an enemy submarine which was travelling at a good speed on the surface, apparently steering about west. She struck her two distinct blows separated by a grating noise along the side of the ship of about two seconds' duration. The submarine was first struck a slanting blow just abaft her conning-tower, fairly hard. The second blow struck her very hard on her tail frame, practically stopping all the way on the *James Fletcher*. The *James Fletcher* claimed that the enemy vessel must have filled and sunk, as her hatches were open and men were on deck; the officer of the watch reported that he distinctly heard voices talking, and saw the submarine with her conning-tower well out of the water, and two or three men standing on deck; the submarine was only about ten yards off on his starboard bow, and when hit she heeled over to a considerable angle. The *James Fletcher* was examined on the mud subsequent to this, and various indications of a recent collision were found below the waterline. The *James Fletcher* received the usual reward for the destruction of this submarine.

Close on this good fortune followed bad luck in the loss of the drifter *Persistive*, sunk by a mine explosion. She was drifting with her nets out, carrying mines; she became foul of some obstruction, and, after vainly endeavouring to clear herself, after disconnecting her battery, she commenced to haul her nets, and after hauling one net the explosion occurred, destroying the ship with the loss of Skipper John Martin Rodwell and six hands; four men were saved, one of whom was injured.

At the end of March 1916 the Drifter Patrol commenced to prepare for its share of a new scheme to annoy the enemy and restrict his operations on the Belgian ports. This scheme,

as already described, consisted of building a combined wall of mines, and moored nets also containing mines, from the Outer Ratel Bank off Nieuport, right up to Dutch waters, off the entrance to the Scheldt. The laying of the nets carrying mines was the Drifter Patrol's share in this operation. Each drifter was to shoot a length of 1,000 yards of nets, which were secured by two anchors and chains to the bottom, and floated to the surface by steel floats and glass bottles, the batteries for the mines being carried on empty Russian mine-cases. The nets were fitted entirely by the drifters' crews who worked by day and most of the night; moorings, batteries, and all were stowed in the boats in an incredibly short time. When completed, the boats left for Dunkirk.

At 4 a.m. on the 24th the squadron weighed and shaped course over the banks in three columns for a buoy lying at the south-west end of the Outer Ratel Bank. Then began the most stirring Bank Holiday that I think any of the Drifter Patrol had ever had. At 6.45, after passing another buoy lying at the north-east end of the Bank, the yacht *Diane*, with Nos. 10, 11, and 12 Divisions of Indicator Nets, proceeded to lay nets three miles outside the position where the mine-net boats had to work, and approximately abreast of Ostend. The remaining division in two lines, led by the *East Briton* and *John Robert*, proceeded up a line previously marked by "dan" buoys east-north-east from the Outer Ratel, until they arrived at a pre-arranged position, where the fourth division of mine-net boats were ordered to fall out and shoot their nets. Two miles farther up the line four other vessels of the first division fell out for the same purpose. At 8.30 a.m. the drifters were attacked with bombs by hostile aircraft, and again at 8.50 and 9.45, rifle-fire being used from the drifters to try and keep the enemy machines up.

When off the Thornton Ridge the *John Robert* and the ninth division were ordered to steer north for two miles, where they anchored in the E. and W. line one mile apart from the rear ship, to guard the north-east flank from enemy

submarines. At the same time the remaining mine-net drifters altered course round the special buoy laid off Thornton Ridge towards the Dutch coast at West Kapelle Lighthouse, the third division commencing to shoot from the buoy, and the seventh division carrying on the line from the third to the sixth mile, and the two remaining ships of the first division laying the last mile towards the shore. The sixth division were then led to a special position by the Raabs Bank, where they were to shoot on arrival of their mark boats.

Now all this narrative may appear very complicated and probably will interest the specialist only. The general reader need only grasp the fact that the drifters were spread out inviting attack in pairs over a length of about twenty miles, and were only twelve miles from the enemy's coast. The support of the two monitors and the destroyers on the horizon must have appeared to them of very little actual use. But they set steadily to work and laid their nets as composedly as if Ostend and Zeebrugge and the enemy's destroyers had been a hundred miles away.

There were, in addition, two detached divisions of drifters—one right away to the north-east on the Raabs, and one to the westward near the south-west Hinder Buoy. More of these anon, but during the laying their support was apparently of the most shadowy description. Of course, I really had the destroyer force disposed so that they could jump at once to any point that might be threatened, and the monitors could waddle—waddle exactly describes their method of progression—after them to assist in case they were out-numbered. But the drifters could not appreciate these dispositions. All they saw was a few fellow-drifters dotted about, the Belgian coast on one beam, and some destroyer smoke on the other.

At about two o'clock a heavy explosion occurred inside the position of the line of nets running from Thornton Ridge towards West Kapelle. Before the drifters began laying their lines of mine-nets, two lines of British mines had been previously laid half a mile inside them by special mine-laying

vessels and trawlers. It was reported that an enemy submarine had been previously seen in this position, and Lieutenant Bell-Irving, R.N.V.R., and Lieutenant Fraser, R.N.R., of the seventh division of drifters, working abreast of this position, stated that the explosion had been the heaviest they had ever seen, Lieutenant Fraser adding that it was a long explosion, as of several mines, and wreckage was seen to be hurled into the air. We devoutly hoped this was caused by the loss of an enemy submarine.

At 3.15 an accident happened to the drifter *Clover Bank*, the last vessel of the patrol towards the Dutch coast; it resulted in her loss, and of that of her skipper, A. Strouger; seventeen men were killed and one was wounded. She had dropped her first battery and run her line of nets correctly, and then, instead of turning outwards to the north to lay her second battery, she apparently lost her sense of direction, turned south, ran 500 yards of cable out directly towards the British line of mines previously laid by trawlers, and had just hoisted out her small boat to connect up the second battery, when she struck a mine aft, killing her whole crew and six hands from the drifter *Alaburn* who were working on board her. *M.L.* 16 and the drifters *Alaburn* and *Mary Cowie* sent their small boats to save life, but only succeeded in rescuing one deck-hand of the *Alaburn*, who was injured, and brought on board the *East Briton*, a drifter which was carrying a surgeon.

At about noon the drifter *Arndilly Castle*, Skipper Souter, reported that a submarine had fouled her first two nets, taking them away from the foot-wires, and towing them across the tide about 400 yards; the officer of the division, Lieutenant D. T. S. Watson, R.N.R., in the drifter *Chrysanthemum*, who hastened to the assistance, found the nets still towing slowly across the tide in a south-easterly direction, the end of one net being kept afloat by the pellets in the first net. He threw two lance-bombs at her estimated position, which failed to explode, and signalled to the yacht *Diane* which also hastened to her support. The *Diane* dropped two lance-bombs, and

then her depth-charge over the position marked by the nets. A heavy explosion took place, followed by a large eruption of air-bubbles and oil. The air-bubbles became much reduced later, but oil continued to come to the surface, and when the yacht *Diane* returned through this position at 5.25 p.m. she passed through pools of oil. The vessels concerned received the usual reward.

At 2.15 the drifter *Gleaner of the Sea*, Skipper Hurren, when at anchor with his indicator nets out astern, sighted a periscope close to his bow. The submarine fouled the drifter's cable, and could plainly be seen foul of her wire. The crew called the skipper, getting the lance-bombs ready as he came forward. The skipper rushed forward, seized a bomb, and threw it on to the foredeck of the submarine, where it exploded, throwing the water over the drifter's foredeck. The submarine appeared to sink bodily down the wire, which parted, the submarine apparently going straight to the bottom. The skipper went full speed ahead, firing the signal for a submarine, and tried to foul the submarine with his nets; a large pool of oil appearing astern of him as he passed ahead. The skipper then marked the position with a buoy. On arrival of the trawler *E.E.S.*, the officer of the division, Lieutenant Harland, dropped three more lance-bombs, only one of which exploded, the depth of water being nineteen fathoms. Large quantities of oil and bubbles were coming to the surface by this time. At 3.55 the destroyer *Afridi* arrived at the position. Oil and bubbles were still coming up in clearly marked lines, and at 4.44 the *Afridi* passed exactly over the spot and fired her sweep. For this successful attack Skipper Hurren received the D.S.C. and his crew the usual reward.

Two other claims for the destruction of enemy submarines were also made. At 4.30 p.m., when the fourth division were shooting their mine-nets in a position off Blankenbergh, Skipper James Smith and the crew of the *Glen Afton* saw the wake of a submerged object pass 200 yards S.S.E. of them, steering about E.S.E. Almost immediately afterwards a

heavy explosion occurred to the S.E. apparently in our mine-field. The crew of the drifter *Fraserburgh*, working next to them, also reported the same explosion.

Lieutenant J. G. Muir, R.N.R., in the drifter *Cosmos* of the detached division by Raabs Bank, which had not been withdrawn, reported that in the early morning of April 25th the noise of a propeller was heard, and twenty minutes later an explosion took place about the position of Lieutenant Crafter's nets. This report was confirmed by Commander G. C. Venn, R.N.R., who was anchored in the drifter *John Robert*, within half a mile of the position of Lieutenant Crafter's nets, who reported being wakened at 1 a.m. by a very heavy explosion which shook his ship violently.

So ended the drifters' spring Bank Holiday. Some of the incidents have been alluded to before, but they are hardly out of place here again in order to give an adequate account of that day's experience of our drifter folk, so different from that of any previous Bank Holiday they had spent at Grimsby, Yarmouth, Stornoway or elsewhere. They had destroyed three enemy submarines, for which they received rewards, with the possibility of two others. They had laid thirteen and a half miles of moored mine-nets, eleven of which were known to be active; one mile had not been joined up owing to the destroyer action¹ and the *Clover Bank* accident. They had been well bombed going up in the morning, and had had the satisfaction of seeing one of the enemy machines destroyed by our own airmen. The only regret was the loss of the *Clover Bank*, with her skipper and seventeen good men. This vessel was a most excellent example of a drifter, and had been the one selected for the King's visit when he inspected the Dover Patrol.

Now the ninth division of drifters, under Commander Venn, had not received the orders to withdraw and was left at anchor on the Raabs. At five o'clock in the morning the enemy's sea-planes were seen flying over the line of our buoys;

¹ See page 158,

they passed over the drifters, but did not attack them. At 6.15 it was still hazy, and the crews in the drifters could hear noises as of aircraft trying to rise off the water. At seven o'clock Commander Venn decided that they came from enemy torpedo craft, firing machine-guns in order to sink mines. He ordered his ships to heave short, ready for weighing. At eight o'clock the haze began to lift, and he saw enemy destroyers inside our line of mines and buoys, and firing at them. He then knew that this was the noise he had heard since six o'clock. He weighed at once and commenced to make for Thornton Ridge at full speed, and from there he steered for the position in which the *Diane* and her three indicator-net divisions had been the previous day. The destroyers began steaming to the south-west inside the mine-field, altering course almost at once in chase of him, and opening fire, the shots falling short. At 9.50 the destroyers had apparently arrived at the line of our mine-nets, the drifters being outside, and were again using their machine-guns, evidently firing at buoys and bottles to clear a way for themselves. The drifters steered to the north-west, the enemy steering directly for them in line ahead. The enemy's shots were now passing over and all round the drifters, and Commander Venn ordered his boats to scatter and do the best they could for themselves.

At this time the drifter *Au Fait*, which it was subsequently learnt had a hot bearing, was dropping behind. She was hit several times by the enemy's fire, and was seen to be stopped, blowing off steam and covered with smoke. The enemy ceased firing and ran alongside her. The other drifters saw her crew take to their small boat, and the *Au Fait* was seen to sink. The enemy, instead of continuing to pursue the remaining drifters, returned to Zeebrugge. Commander Venn collected the drifters, and proceeded down the line towards Dunkirk. Skipper Charles Bridge of the *Au Fait* and all his crew were captured, and, with the exception of the skipper, who was released to Holland in the middle of 1918, remained prisoners till the Armistice was signed,

At the time it was not easy to understand why these three enemy torpedo craft failed to pursue and destroy or capture the whole of this division of drifters, but Skipper Bridge, who rejoined the Patrol after the Armistice, reported that directly they came alongside his vessel, the first question the Germans asked him was if the other drifters had got wireless; he at once replied, "Yes," though, as a matter of fact in these early days, no drifter had either wireless, or armament except rifles. The enemy was evidently afraid that the drifters would bring our destroyers on him, and considered discretion the better part of valour. The skipper had no secret documents of any kind in his ship, except his operation orders for the day. These he said he slipped into his drawers, and he states that he was not searched, but he and his mate were taken to Zeebrugge that night and locked up in a prison cell, where he spent from 9 p.m. to 3 a.m. chewing the same orders. Though his ship was very much shot about, none of the crew was seriously injured.

On discovering that their messmates were prisoners, the officers and men of the Drifter Patrol decided that they would endeavour to feed their comrades with parcels, through the Ladies' Emergency Committee of the Navy League, and when later another drifter's crew from the *Roeburn* became prisoners they took them on as well, and this Patrol provided from their own pockets the sum of £539 17s. 5d. towards feeding their comrades, who were in captivity.

The remainder of the sections of nets to complete the barrage were laid by the drifters without interference on the part of the enemy. The work of hauling defective and shooting new nets went on continuously, sometimes only one or two nets, on other occasions two or three miles at a time, until November 1916, when, owing to the short days and bad weather allowing so few occasions on which the work could be carried out, I ordered work to cease on the Belgian coast, and be concentrated on the other barrages which had since been started,

Occasionally we came across evidence of the loss of German vessels. In one case, where nets had been damaged, and mines fired, the body of a German petty officer was brought to the surface. In another, the chain that ran along the bottom of the nets could not be weighed on account of some great weight lying across it. Undoubtedly a vessel had found her last resting-place in the barrage. The history of that barrage and its hidden prey will never be known, but without doubt it was a sea "oubliette" of a weird nature. Above, the tides ran and obliterated indications of what had happened below during the night, but there are unquestionably many tales of secret happenings that can be imagined, but will never be written.

In September 1916 the Patrol laid an altogether new section of moored mine-nets. They were laid at the north end of the Goodwin Sands, running outside the old position of the North Goodwin Light-vessel, ending outside of and nearly up to the Elbow Buoy. This section was one of the most successful of all our mine-nets. The nets were extended to overlap the north end of the Sands, and a section was laid abreast and outside of the Elbow Buoy to cover the gap between our nets and those laid by the Nore Command, and they remained in position until the Armistice was signed on November 11th, 1918.

Two divisions of drifters, working alternately, were in charge of them, continually hauling bad nets and replacing them with new ones. Before these nets were laid, the enemy had mined round both the Elbow and No. 2 Elbow Buoys, but from the time these nets were laid, although there were one or two false alarms, on no occasion was the area inside these nets mined by the enemy. Although it was never proved, I have the strongest belief that more than one enemy submarine was at one time either destroyed or seriously damaged by these nets. That they were efficient I had good proof, in their effect on British vessels which neglected to maintain their proper course and carry out their instructions, when proceeding to the Downs from the northward.

At the same time the Drifter Patrol commenced a new, and, as it proved, the hardest of all its endeavours to stop the passage of enemy submarines. This was no less than an endeavour to build a continuous line of moored mine-nets, supported by buoys every 500 yards, across the Channel from the Goodwin Sands to the Snou Bank off Dunkirk. This work was, of course, the heaviest when strong winds from south-west or north-east for any length of time occurred, with spring tides—the strength of tide reaching as much as five knots; ordinary tides could be expected to be at least two and a half.

The details of the Barrage have been dealt with in a previous chapter, but no account of the work of the Drifter Patrol would be complete without a reference to the part they played in this gigantic task, involving unceasing work, almost a labour of Sisypheus, but persevered in with dogged pluck. It was the only possible means I could devise, in the absence of good mines, for coping with the submarines passing the Straits. The new-pattern mines were not available, and were not to be so for another year, so the herculean task was tackled in the hope of meeting, to some extent, the situation.

All my officers were of opinion that the attempt would not succeed; but I was determined not to abandon the project unless experience proved it to be an impossibility.

This new barrage was patrolled at night by the drifters, with a very thin destroyer support. The reasons for this scant support are given in Chapter XII, so it need not be further mentioned, but some form of look-out was essential to prevent surface vessels attacking the Barrage or breaking through down Channel. The drifters were the only craft that I had for the duty. They were, of course, practically unarmed, and, if seriously raided by destroyers, were bound to suffer considerably. But this is the fate of all videttes; war is no play-time, and risks must be run by all classes of vessels if conditions demand their use.

The raid of October 26th–27th, 1916, has been dealt with

from the destroyer point of view; it remains to tell the drifters' story. Four divisions of drifters were patrolling the barrage on this night. The eighth division, consisting of six vessels, was between the Goodwin Sands and a buoy five miles to the E.S.E. The tenth division, of five vessels, was between No. 5 Buoy and the tenth mile from the Goodwins on the same bearing, and the sixteenth division, of six vessels, was between the 10th Buoy and the buoy marking the end of the Ruytingen Shoal; the twelfth division, of seven vessels, being between the Ruytingen Buoy and the Dyck Shoal. The yacht *Ombra*, and the armed trawler, *H.E. Stroud*, were in support of this drifter line, as well as of the old 30-knotter *Flirt*.

The Drifter Patrol suffered the loss of the following vessels, sunk: *Roeburn*, *Spotless Prince*, *Ajax II*, *Gleaner of the Sea*, *Launch Out*, and *Datum*, with severe damage to the drifters *Waverley II*, *E.B.C.*, *Pleasant*, and the trawler *H.E. Stroud*; with the loss of fifty-five officers and men, killed and missing, believed drowned, and five wounded. One officer and nine men of the killed and missing were subsequently found to have been taken prisoners and carried to Germany. The twelfth division was not attacked, and remained on patrol until daylight next morning.

It was hard luck on the little vessels! I issued the following memorandum at the time in appreciation of their services:

"The brunt of the attack fell on the advance patrol of drifters, whose presence and action signalled the arrival of the vessels and gave the alarm. It must be a matter of satisfaction to the Drifter Patrol, that it was through their vessels that the warning was given. I regret the loss of so many valuable officers and men, but losses are inseparable from warfare. The drifters had on this occasion, and probably again will have, exposed positions in which to carry out important duties, and I have much pleasure in once more calling the attention of the Admiralty to the way in which the Drifter Patrol have faced dangers and carried out their duties."

During the winter the drifters on the cross-Channel barrage had a bad time. They were cheered on three occasions by most suspicious damage to the nets, but in the strong tide diving, for examination purposes, was impossible, and therefore the loss of enemy vessels could only be assumed. The drifter *Protect* was lost in March 1917 in weighing a fleet of nets: a heavy explosion occurred, doubtless owing to a mine having drifted in the net. Only three hands were saved.

On April 19th six German sea-planes attacked the mine-net division guarding the North Goodwin Nets. One of these machines endeavoured to torpedo a drifter, by a torpedo dropped from below the body of the machine; the torpedo missed the drifter astern by about twelve yards. The drifters engaged with their guns, but without result. This is an example of how the Germans wasted a new idea. Instead of trying to sink a large liner, they gave away the system in an attack on a little drifter.

The German aircraft did not, however, always get off so easily, for on one occasion, when Lieutenant H. B. Bell-Irving, R.N.V.R., arrived early on his patrol-station, he heard sounds of machine-gun fire, and saw five enemy machines flying low in line ahead, firing at each buoy as they passed it. The drifter manned her gun and loaded with tracer shell, and waited the enemy's approach. She opened fire at 1,500 yards. The first and second shots fell directly under the machine. She promptly increased her range to 2,000 yards, and the third shot hit the enemy machine amidships, causing it to explode, and bringing it down. A second enemy machine almost immediately landed close to the first one, and the drifter fired two more rounds at the machine which had landed, whose pilot was endeavouring to pick up his damaged comrade, and three rounds at the machines which were circling overhead. The drifter proceeded to chase the machine which was on the water, and which was taxiing to the eastward. This craft was in trouble as it could not go straight, one of the floats having been hit by the drifter's fire.

The firing-pin of the drifter's gun had broken ; the gun-layer changed it ; fired three more rounds at the machines in the air, which cleared out, and five more rounds at the machine in the water, which stopped. The yacht *Diane*, which had come on the scene, took the two aviators prisoner, and endeavoured to tow the damaged machine, but unfortunately the machine broke and was not got into the harbour.

The gun-layer of the drifter was a fisherman named Walter Cowell, second hand, and I venture to think his hitting two sea-planes, direct hits, with a six-pounder in this way was remarkable—as difficult an operation as shooting rocketting pheasants with a '303 rifle. For this service Lieutenant Bell-Irving received the D.S.C. and the gun-layer the D.S.M.

Lieutenant Bell-Irving subsequently received a bar to his D.S.C. for gallant conduct in connection with an attempt to salve the *Redcar* after she was mined. He was in her when she sank, but jumped into the water just in time to clear the vessel.

I had reason to believe that the enemy submarines passed through a narrow gap that had been left between the end of the Barrage and the Goodwin Sands. I therefore had flanking nets half a mile long laid in this position. Soon after laying, the nets were fouled and so heavy a weight lay on them that they could not be weighed. Diving was attempted, but the tides were so strong and the water so muddy that the divers gave up the attempt. Very little doubt exists but that a U-boat lies close to the old No. 1 Buoy, at the edge of the Goodwin Sands.

A sad loss was sustained by us in June 1917, when the drifter *George V* was sunk through the explosion of one of her own mines ; Lieutenant H. B. Condry, R.N.R., A. E. Cook, skipper, and seven hands were killed and one man wounded. The case was clearly proved to be one of neglect to carry out regulations through over-confidence, which is always one of the great dangers in handling explosives. Lieutenant Condry was one of the smartest and most gallant and hard-working officers

in the Patrol. He had been previously recommended for the D.S.C. for his work in 1916; his widow subsequently received it. His loss was greatly deplored by the Patrol.

In July, as already explained, the Belgian coast barrage was re-established. The drifters, of course, did the net-work; but their aptitude at net-work had so increased by practice throughout the winter that, instead of taking seven hours as in 1916, in 1917 twelve miles of nets were laid and made active *in one and a half hours*—a fine performance. One submarine was reported to have been blown up. The drifters came in for a little shelling, but nothing to speak of.

As in the previous year, the Barrage was steadily increased in length by the drifters working with the daily monitor patrol. It was quite like old times again for the drifters to see Ostend and Zeebrugge, while shell from the Tirpitz Battery occasionally tried to catch the monitors.

A sort of beggar-my-neighbour game went on throughout the remainder of the year. The drifters, finding a gap in the nets, would lay a "fleet" totally submerged, in line with the gap, but nearer the shore, so as to trap any vessel trying to use the hole. The enemy sank our battery-boxes; we laid dummy battery-boxes for them to sink, and submerged the real batteries in water-tight mine-cases, and so on—some new steps always being taken by one side or the other.

The mines for the Folkestone-Grisnez barrage began to arrive in November 1917, and, as soon as the first four lines were laid, I commenced the patrol of the area to cause the submarines to dive at night. The drifters on the Goodwin-Snou barrage were gradually moved farther west, but the latter barrage was kept in repair as a deterrent to surface craft.

On the night of December 19th-20th we bagged our first submarine in the mine-field; several of the crew were blown up to the surface; only one was picked up, and he died shortly afterwards. The drifter division close by received the reward. Towards the end of the month I was

able to increase the drifters on the mine-field, and brought a division of the Ram-gate drifters to assist.

At the same time I kept a lively eye on the defence of the vessels on the barrage line. Such a defence was child's-play compared with the defence of the drifters on the Goodwin-Snou barrage towards the end of 1916. To begin with, our destroyer force had been nearly doubled, and the line was fourteen miles farther down Channel. No attack by the enemy should have gone unpunished, and, had the shallow mine-field I proposed been laid, it is doubtful if the line would have been attacked as it was early in 1918.

I wonder if the above rapid survey has conveyed a picture of the work of the Dover drifters. I wish that I could portray the mental pictures that arise of the labours of those vessels; but, unless the eye has seen the spray and the waves, the pitching and rolling, the head gales and the dim outlines of the little ships on dark nights, when ploughing across the North Sea keeping station on the monitors, it requires a more facile pen than mine to translate such memories into words. What a volume really lies in the sentence "worked on the cross-Channel Barrage"! Twenty-five miles of nets hidden below water, heavy moorings and buoys rising and falling with the sea, and a mill-stream of tide racing past; the hour or so of slacker water seized to effect repairs; the cold, the cheerless disappointment of damage worked by tide and gale combined; miles of nets to be renewed,—to describe all that that meant would merely bore the reader, and even then no adequate conception of the work would be conveyed.

I have had to be content to suggest in these few pages the varied work of the Dover drifters, manned by ordinary everyday fishermen who in war-time had been suddenly called upon to face the enemy and work new nets on new methods under fire, their divisions being commanded by gallant officers of the Royal Naval Reserve. They worked as thoroughly, steadily, and pluckily as if fighting was their trade. After the raid of October 26th-27th, 1916, they went on with their

duty of watching the nets as steadily as before. They had fought the sea all their lives, and they fought the enemy with equal confidence. They continued to patrol with the thinnest of support, since the waters in the forefront of the Patrol, with their varied vital interests, were too extensive to admit of real support being given to them; no larger vessels could be spared, so the brunt of the vidette work fell on the gallant little drifters. This work they cheerfully did, and earned a reputation of which they may always be proud. May good luck attend them! No officer of the Dover Patrol will ever pass a "Dover" drifter in harbour without going on board and wishing her skipper and crew good luck in remembrance of their old association in the Great War.

WATCHING THE DOVER STRAITS

It's dark as hell, and we cannot see a bare two cables' length.
The tide's aflood, the sea flat calm, and the wind ain't got no strength.
We're watching nets out here alone, just us and our other mates.
The destroyers are well three miles away as we watch the Dover Straits.

We helped at the bombardments by shooting our net defence,
The shell fell thick around the boats, but that made no difference.
We lost the good old *Sanda* there by one of them German Eights,
But we'd sooner be 'er on a show like that than watching the Dover Straits.

We laid out two bar-rîges right up off the Belgian coast,
We've been mined and bombed and shot at p'raps more than's fallen to most.
There's precious little we haven't done, 'least, so we calculates,
And there's always this job, my lads, to do of watching the Dover Straits.

We've rifles and twenty rounds or so, and flares to give alarm,
To signal the Hun in case he comes ; 'twill stop him doing harm.
If their destroyers come, my lads, we're booked for the Golden Gates,
But no one shall say that we funk'd the job of watching the Dover Straits.

CHAPTER XVI

THE FRENCH COAST

The relations between the British and French Admirals—The martyrdom of Dunkirk—Two hundred and fourteen bombardments—The Commodore—The danger of the Roads as an anchorage—The left flank of the Army—Possibility of a German landing—The King and Queen of the Belgians—The doings of the French Patrols—The R.N. siege-guns and emplacements—The British Army's evacuation of the coast.

UP to the end of 1915 the command of the vessels of the French Navy was entirely vested in the Admiral commanding the north coast of France, whose headquarters were at Cherbourg. Vice-Admiral Favareau held this command, and our relations were most cordial. At the end of 1915 it was decided to place all the vessels operating in the eastern part of the Channel under the British Senior Naval Officer. Rear-Admiral de Marliave was appointed as Senior Naval Officer on the French coast, and it would have been difficult to find a more charming man and accomplished naval officer to work with. An early conference was held at Dover and the general lines on which we were to work were arranged. These differed little from those already in existence.

Admiral de Marliave, of course, retained the whole of the administrative functions of his command; it merely fell to my lot to arrange the disposition of available vessels. But, here again, obviously all such dispositions were made with the concurrence of the French Admiral. Matters of this sort are easily adjusted when both sides have in view only the successful prosecution of the war, then any personal considerations and national jealousies disappear. It was my business to make myself acquainted with the ideas of the French Navy, and

to recognise the French point of view in many details where they differed from ours, and to adjust the use of their vessels, having those considerations in mind ; and, on the other hand, the French Rear-Admiral, sinking all prejudices, loyally supported me, and gave me the full advantage of his valuable opinions on the particular situations as they arose.

The question of trade routes, mine-sweeping, and drift-nets all came under review, and although in such matters I considered that the French Senior Naval Officer should have full control on his own coast, subject to the general policy of the area, he elected to send his officers over to Dover to study our methods and appliances, taking the broad view that, with our large coast traffic, we had had better opportunities of gaining experience than the more limited traffic on the French side had afforded to those under his orders. The result was most happy, since the systems on both sides were broadly unified with the greatest good-will and understanding.

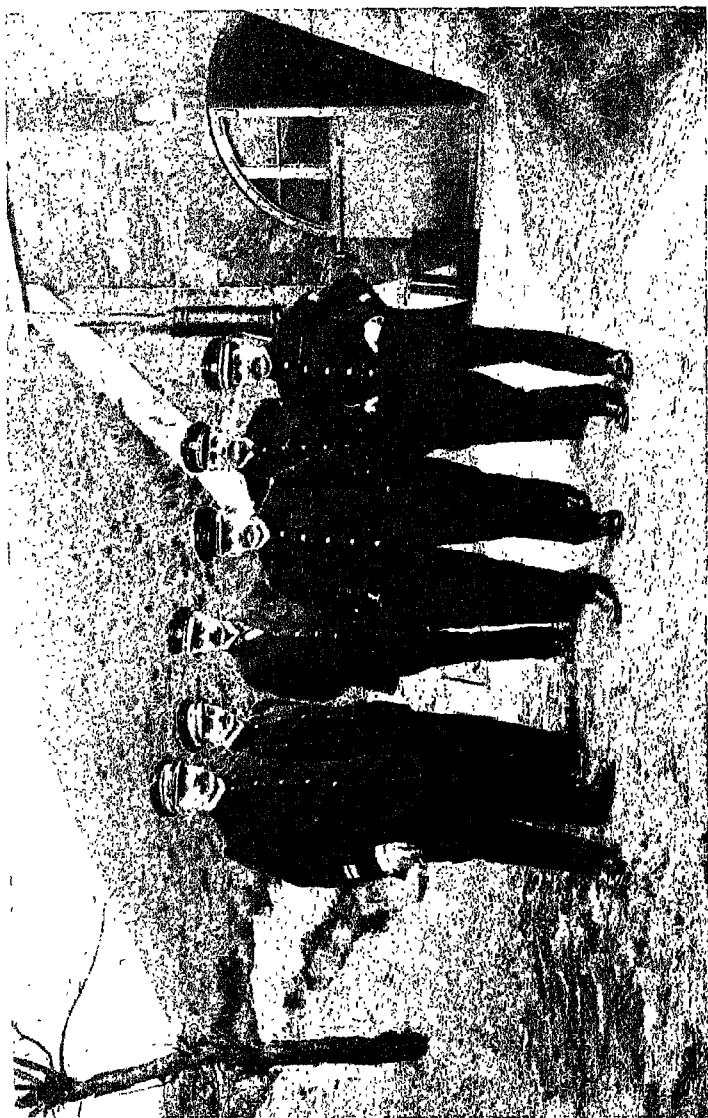
One point had to be recognised, namely, that the French nation, with a huge army, and a fleet in the Mediterranean, and a smaller fishing-fleet in peace-time than this country possessed, could not supply stores or vessels in our area on the same scale that our Admiralty were supplying us. It was, therefore, necessary to exercise more care in husbanding what resources they had, since losses in trawlers, especially, were irreplaceable. I therefore arranged for our trawlers to assist in sweeping the entrances of Boulogne and Calais, inside the Bassure de Baas, and the direct channel to Dunkirk ; but, with these exceptions, the sweeping and protection of their coast trade fell entirely to our gallant neighbours.

The French destroyers took the patrols to the east of the Zuidcoote Pass, and the Dunkirk Channels as far as the Ruytingen Shoal, thus forming the nearest outposts to the enemy. Particularly gallant was the service of the small destroyers in West Deep ; they were hopelessly inferior in fighting power to the German boats, and yet steadily patrolled night after night within fifteen miles of Ostend.



CAPTAIN F. BIRD AND HIS DRIFTER FLAGSHIP THE "FAST BRITON"

PLATE LXVIII



ADMIRAL RONARCH AND HIS STAFF.

On January 26th, 1916, Rear-Admiral de Marliave hoisted his flag on board the *Lord Clive*, and commanded a division of the monitors while we bombarded the enemy's strong positions at Westende. This is probably the only time in history that a French Admiral has commanded a division of English men-of-war in action. The monitors were the *General Wolfe* (flag), *Lord Clive* (flag of Rear-Admiral de Marliave), *Prince Eugène*, *General Craufurd*, and *Marshal Soult*. It was the Kaiser's birthday, a fitting occasion for a joint effort of the French and British Admirals.

In the beginning of May Admiral de Marliave was appointed to a command in the Mediterranean, and Vice-Admiral Ronarc'h took over the naval command in the sphere of the northern armies of France, and it was with many regrets that we said good-bye to a courtly gentleman and a gallant naval officer.

Admiral Ronarc'h was the hero of Dixmude, having commanded the Naval Brigade in 1914, during the German advance into Belgium; his stand at Dixmude helped materially to check the advancing wave. It was not till the troops on his flank fell back that his gallant force was obliged to yield ground, but even then it fought inch by inch, till the remnant had to swim the canal under the close fire of the enemy. I look back on my cordial relations with Admiral Ronarc'h as one of the brightest spots in a somewhat uphill and arduous command. He possessed great experience and shrewdness, and yet was always ready to enter into the spirit of a new adventure. Our "potager," as we called the barrage mine-field, was a source of interest and amusement. The details of the Great Landing and the Zeebrugge Mole landing, were all discussed with him, and always with advantage. He was ever ready to smooth a local irritation and help our vessels as fully as his own. Fortunately he remained in command during the remainder of the war. The French Admiralty wisely recognised the value of experience in their officers in high command.

Dunkirk was the headquarters both of the French and

British naval forces on our Allies' coast—a town of a hundred memories, to which three years of assault by gun-fire and aircraft were added during the war. It would have been a good object lesson if some of our municipalities, who shouted when they were scratched, could have sent a few aldermen and councillors to pass a night in Dunkirk during the winters of 1916-17.

Plate LXX shows the martyrdom of this town from bomb and shell. Of course many towns suffered more. Some, such as Ypres, Nieuport, and Armentières, were most severely handled; but Dunkirk could not be deserted. The unloading of ships and the provisioning of the armies had to continue, and therefore the civil population had to stick to their posts. They suffered as many as five raids in a single night, and a total of 214 bombardments by air and sea. Seven thousand five hundred and fourteen bombs and projectiles were thrown into the town, 233 persons being killed and 336 wounded.

The comparatively few casualties are accounted for by the universal use of cellars as shelters during the raids, which meant security at the expense of comfort. The most remarkable thing for some people in England to ponder over is that the inhabitants never complained. They recognised that they were at war and that, as their geographical position was their fortune in peace-time, they had to put up with the consequent disadvantage in war—*voilà tout!* Rightly the town was awarded the Croix de Guerre. I asked for it to be given the D.S.C., but this was a flight of imagination above the official British mind; we do not grasp the patriotism of locality in England in the same vivid manner as they do in France. It is a pity.¹

Now Dunkirk was an enormous asset to us, but a very long way from being perfect. It was the fashion to grumble at Dover as a harbour, and truly that place was not pleasant in a gale; but there was room for a considerable number of vessels,

¹ Since writing the above, H.M. the King, with his usual insight and tact, has presented the D.S.C. to this war-worn town.



while Dunkirk was much more cramped. The French gave us all the space they possibly could, however, and we did not do so badly. There was berthing space for three 12-inch monitors alongside the main tidal jetty. In fine weather two could lie abreast, and so increase the accommodation; but, with the wind to the northward or north-eastward, a nasty swell set in the harbour which severely tested the springs and breasts.¹ There was, in addition, room for about half a dozen destroyers, but the larger boats, such as those of the M. Class, drew too much water, bringing the inlet pipe of their condensers too close to the bottom, so that mud and fish got sucked in, which meant the choking of the circulating water and leaky tubes. About twenty drifters huddled together, with two small monitors, and four paddle mine-sweepers completed the usual berthing. Later on a portion of another jetty was devoted to coastal motor-boats, and a kite-balloon barge inhabited the "bassin."

In October 1915 our establishment at Dunkirk had so greatly developed that I asked the Admiralty to appoint a Commodore as local Senior Naval Officer. Captain Charles Johnson, D.S.O., the "Captain D" of the 6th Flotilla, was appointed, and most ably carried out the duties. Later on, in 1917, owing to a break-down in health, this officer was succeeded by Captain Hubert Lynes, D.S.O., who continued with ability the good work of his predecessor. The local D.N.T.O.'s were, in succession, Captain Marescaux, Captain Benwell, and Captain Hamilton, and these officers, with the exception of the first, who acted as Senior Naval Officer before the Commodore was appointed, were almost entirely occupied with transport duties.

Outside the harbour lay the Roads. Now, any one acquainted with charts, looking at the chart of the Patrol, will see that they were flanked to the north-eastward by a network of shoals. In fine weather or south-westerly winds the anchor-

¹ Springs are ropes that prevent the ship springing ahead or astern when moored to a jetty. A breast is a rope that keeps the ship pulled close on to the jetty.

age was a good one, but at high tide, when the banks were well covered, a north-easterly gale raised a nasty sea, which meant parted cables and dragging. But the weather troubles were nothing compared with the danger of attack by the enemy on the ships lying in the Roads. There was practically a depth of eighteen feet of water everywhere over the banks at high tide. Dead open to the North Sea, only twenty miles from Ostend, quite incapable of any effective temporary defence, it was with the greatest misgiving that at first I regarded this anchorage for our monitors and destroyers, and yet gradually it became one of our main anchorages.

Of course we mined the channels between the banks to the eastward; but, if the enemy had really sat down and considered the matter seriously, he must have come to the conclusion that we could not mine the banks themselves, as the water was too shallow and the mines were bound to break adrift. He would have been quite safe, therefore, in approaching along the banks to attack the anchorage. Was he afraid of the shore guns? Again, he must have realised the difficulties of shore batteries firing at night with friendly ships at anchor near by. No, it is inexplicable. Merely to come up and fire torpedoes over the Hills Bank would have been quite safe; but the German spirit had no sea inspiration.

At all events, thank goodness, the enemy did not attack the anchorage. It would have been an infernal nuisance. Having the initiative, he held the trump cards of time and direction of attack, so that nothing but bad luck would have prevented him doing us considerable damage. Moreover, the actual damage of a torpedoed monitor or a destroyer sunk would have been by no means all that he would have achieved.

By the success of an attack he would have denied us the use of the anchorage for our vessels in the future and increased our difficulties a hundredfold. One good attack, and we should have had to attempt a net-and-mine defence, which would never have been really efficient and would have meant a great

expenditure of time and material, and the locking up of men and vessels.

It is quite easy to sit in an arm-chair and say, "But you can patrol here and patrol there and cut them off." Such talk is all nonsense when you are confronted with the realities of tired crews, shortage of vessels, pitch darkness, shoal-water, and a crowded anchorage. Upset an inkpot on your chart after you have arranged patrols ; appreciate that that dark expanse is night about new moon and a declination of 20° south ¹; and then estimate the value of your disposition from the practical standpoint. Facts are facts in war, and initiative carries at least nineteen out of every twenty points in favour of success.

Hill's Pocket, just above the Bank, was a favourite anchoring place if an early start had to be made by vessels in the morning, and if there would be too little water on the Bank to allow them to pass over ; for it should be noted that the route to the patrol-line led right across this Bank. Ships were not supposed to use this anchorage unless obliged to do so. It was here that the monitor *Terror* was torpedoed under the following circumstances. Arriving late at night from the patrol-line, she anchored in Hill's Pocket. About 11 p.m. two German destroyers steamed past at high speed firing three torpedoes, all of them hitting her forward. At the same time search-lights were seen near Y Buoy. It is probable that the German destroyers divided into two portions, one remaining at Y Buoy to bombard Dunkirk, the other raiding to the north-eastward of Hill's Bank. Exactly for what purpose they did so it difficult to say, unless they were going to fire torpedoes into the anchorage over the Bank. The *Terror* must have been a surprise to them. The whole of the bow of the *Terror* below water was blown away, but her bulkheads stood and she was

¹ When the declination of the moon is south it travels farther below the horizon than when north, and consequently even the stray light about a new moon time is lost.

taken to Portsmouth for repairs. This was the only time that the enemy destroyers ventured nearer than Y Buoy.

Towards the end of 1917 the possible use of imitations of our coastal motor-boats caused me some apprehension, and it is difficult to imagine that, had the war continued, and material and manufacturing ability been available in Germany, craft of this nature would not have appeared at Ostend and been used against ships at anchor off Dunkirk. Plans for a light boom were got out, and experiments carried out with sections both at the Downs and also at Dunkirk. A very light obstruction only was necessary to stop such frail craft, and a spider's web, if it had been visible to the airmen, would have provided the enemy with a sufficient reason for not attacking. The problem, therefore, was not a very difficult one. In the meantime casks and buoys did service to frighten them away.

On dark nights I had the Roads cleared, the ships weighing after dark and anchoring in new positions, some just to the westward of La Panne and some as far west as Le Clipon. It was just as well to forestall possibilities by new dispositions made under cover of night, and therefore invisible to the enemy: attention to little details of this sort largely accounted for our immunity from attack. Needless to say, these vessels returned to the normal anchorage before it was light enough for the enemy's airmen to observe their night positions.

I have already mentioned the difficulties associated with the protection of the left flank of the Allied Armies. What a chance the Germans had of inflicting a master-blow and practically taking the coast, at all events up to and including Dunkirk! The only difficulty lay in the design of suitable craft; but this was by no means an insuperable one. Consider the issue at stake. The scheme already outlined would have been to throw 60,000 men on to the beach between Oost Dunkirk and Coxyde.¹ The beach was very much the same in general characteristics as that portion which we had selected

¹ See Chart of the Patrol.

for our landing between Westende and Middelkerke. To land successfully, the boats should not have drawn more water than 2 feet 6 inches, their beam being limited by the breadth of the lock-gates of the canal, say 16 feet. A speed of 5 knots only would have been required, and a boat about 120 feet long should have sufficed, rather like a long punt. Of course absolutely smooth water would have been essential to success. But modern naval constructive genius should have enabled a suitable design to be produced. If necessary, boats could have been transported along the canals in sections should any of the locks not have admitted of the full length of the craft.

The boats would have been deserted after landing, their functions being ended. Their construction, therefore, might have been of the lightest possible nature, since damage on grounding was immaterial. A broad front would have been available for landing on. The lines at Nieuport would have been taken in reverse, and pinched through, and land communication with the main army would have been established.

Against such a landing in early 1916 no real defence existed. I brought the danger to the notice of G.H.Q. in France, and the Admiralty, since I recognised that I had far too small a force available to stop such a project. I might attack and damage the enemy while he was making the attempt, but anything approaching destruction was quite out of the question. I also visited at Amiens General Foch, who commanded the Northern Armies, and by his direction the trenches facing the sea had the sand removed from them, and additional guns were mounted, and, what was more important, machine-guns were placed in the Dunes. What were the chances of success of such an attack? Personally I think that they were very great. A raid on the Channel and the Downs, if made in relays or in force, would probably have necessitated moving our destroyers to the westward; a pitch-dark night would have hidden the advancing boats, and quite a light smoke-screen would have made them invisible in the light of star-shells. They might easily have got to within half to three-quarters

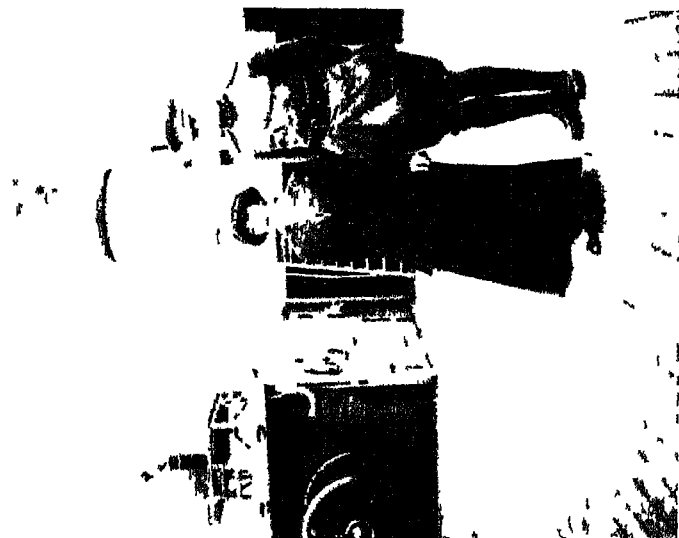
of a mile from the shore without being seen. Then about ten minutes only would have remained wherein to repel the attack. The boats would have kept their motors running right up to the time they bumped on the beach, and the Dunes would have been seized just as daylight broke.

The assets possessed by the Germans were the ability to practise the whole operation inland in Germany; the canals to bring up boats almost indistinguishable from barges; the short distance (only eight miles) from Ostend to the landing-place; and the immense advantage of having the initiative. It would have been a grand stroke to have brought off. For with a strong offensive at Ypres in progress; with our reserves implicated; with only one French division to hold the Nieuport lines; and with only a division of Belgian cavalry and a few Belgian troops resting at La Panne, the coast could hardly have resisted a combined attack in front and on the flank.

Well, the Germans never tried it, I am glad to say; but the possibility of such an attack was one of those restraining factors which kept vessels locked up at night and unavailable for use in other parts of the patrol.

In General Rouquerol, who commanded the division of French troops on the coast, I had a firm friend and delightful colleague. Our work together was absolutely harmonious, and he was always ready to help us by providing gun-positions for our heavy guns, or in any other way that he could. The naval siege-guns under Captain Halahan worked directly under his Chef d'Artillerie, Colonel Barbier, but the larger guns, the long 12-inch and 9·2's, being mounted specially for the coast advance, I kept under my own orders, although the officers in command had orders to comply with any request from the French General, and the latter had free use of the whole in cases of emergency. The generals successively commanding the army on the coast were General Hely d'Oisel, General Mondesir, and General Balfourier, and with all of them our relations were most cordial.

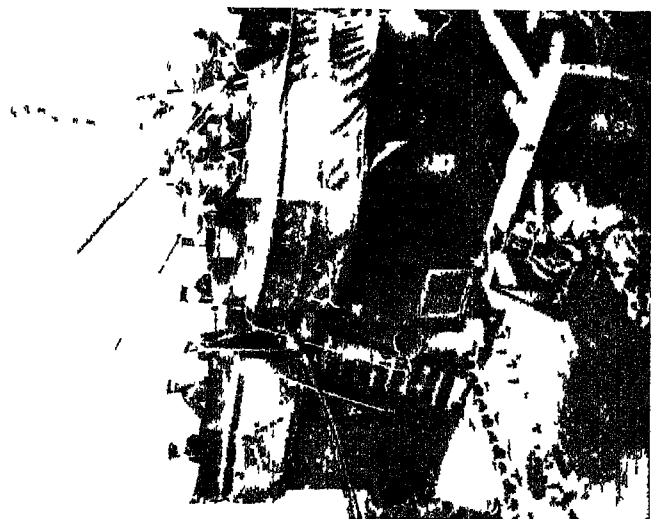
The British Mission to the Belgian Headquarters at La



THEIR MAJESTIES THE KING AND QUEEN OF THE
BUGIANS

PLATE LXVI

43-1



THEIR MAJESTIES THE KING AND QUEEN OF THE
BUGIANS ON TOUR IN AMERICA



GENERAL ROUQUEROL AND PRINCE ALEXANDER OF TECK
PLATE LXXII

Panne was also of the greatest assistance. The first chief was Major-General Tom Bridges, C.B., of St. Quentin fame, who was afterwards succeeded by Prince Alexander of Teck, subsequently created Earl of Athlone. This link with the Belgian and the French Armies was most valuable. In fact, the Mission at La Panne became the centre of communication between the Navy and the armies on the coast, and I owe a great debt to these two officers for the assistance afforded, and the sometimes delicate negotiations carried through by them.

I cannot refrain from expressing my respectful regard for their Majesties the King and Queen of the Belgians. The attitude of the King has been one of admiration to the Allies, and to all nations who appreciate honourable conduct. May I suggest that Her Majesty deserved equal recognition? The King, no mean engineer and yachtsman, always took a lively personal interest in the doings of the Navy, and the Queen, I always maintain, is the very best lady sailor in Europe. It was to them a holiday from the anxieties of the war to come occasionally on board a British man-of-war, and at times—unfortunately few—to cross the Channel in a destroyer for the purpose of taking their sons and daughter to or from their schools in England. Nothing pleased the Queen more than that it should happen to be blowing. On the bridge, or, if the sea permitted it, on the fo'c'sle, swept by the wind, and washed by the spray, she thoroughly revelled in the motion of the vessel. If the Belgians had a Navy, it would idolise their Queen.

The King also enjoyed the trips. Never during the war did either of them live anywhere but on Belgian soil. When during the 1917 offensive La Panne became quite unsafe, they moved to a château a little farther south, but no farther from the lines than La Panne. It was one of our great pleasures, when work permitted, to have the honour of a visit to our ships from their Majesties.

I always had a half-conscious fear of the King being kidnapped. Fourteen miles only from Ostend, a sandy beach,

three fast motor-launches, a special beaching boat, some three or four soldiers only on guard at the palace that faced the beach and open sea, formed a combination that might have tempted an enterprising German to make the attempt. At all events, it was one of those *coups* which might have come off, and was well worth a trial, if only to say it had been done.

Lord Fisher had the best brain of any one I ever knew for devising undreamed-of schemes. I am glad that a prototype of Lord Fisher did not command the German forces on the Belgian coast. Life would have been full of unpleasant surprises! I should have been sorry, with my meagre force and the innumerable objectives that were open to attack by the enemy, to have been "up against" a second "Jackie Fisher" with a mind full of daring and ingenious ideas.

Our other connections with the Army have been touched on before; namely, our assistance in shelling from the sea, and feigning attacks on the coast in order to keep troops in reserve and away from the areas of projected attack, down south. I would merely emphasise again that help from ships given to an army ashore is necessarily very meagre. Want of intimate communication limits the closeness to our own positions at which fire can be used; and the difficulties of accurate shooting from a moving platform discount greatly the value of such fire. Moreover, the use by us of wireless for spotting was apt to disorganise the army aeroplane signals. When in 1917 the Germans rushed our coast trenches to the eastward of the Nieuport Canal I noticed that critics suggested that the Navy should have prevented this.

First, how can the Navy take a part in a hand-to-hand *mêlée* such as an assault on trenches? Secondly, how can it foretell, any more than the troops attacked, that an attack is about to take place? Thirdly, how can 8-knot ships be suddenly whisked sixteen miles? It is not profitable to keep ships under the fire of shore batteries for days—even if they are not knocked to pieces in one day—in order to take part in problematical

attacks. As a matter of fact, the assault was so sudden that the first news that H.Q.'s received that anything more than the general "strafe" was in progress was a German W.T. to say that the trenches had been taken.

The arrangement between the Navy and both the British and French Armies was that three monitors, and if possible more, should be available for firing on any target that the military authorities might desire, commencing firing two hours after the request was received. The targets were all selected beforehand and lettered for reference, the firing positions both for the Dunkirk monitors and those on the patrol-line were fixed, and communications with the shore and spotting details were arranged, so that all was in train to move the moment the Commodore at Dunkirk received the telephone message. The targets arranged by the Army were, of course, back areas, since tickling up the reserves of the enemy was the only practical use to which the fire from the ships' guns could be put.

The work done by the French vessels was beyond all praise. The French Admiralty was unable to detach a large force for work in the Eastern Channel. About six or eight small destroyers, really torpedo-boats, and four large destroyers, constituted the fighting force, and in addition Dunkirk, Calais, and Boulogne were provided with local forces for mine-sweeping and trade regulation. Of the large destroyers, as a matter of fact, only two were usually available owing to repairs and refits, and these worked with our vessels on the patrol-line, and very soon became accustomed to our methods of manœuvring and signalling. These vessels were of great assistance in increasing the number of our Belgian coast patrol, a very valuable addition to our small numbers. On October 27th, 1917, the destroyers *Capitaine Mehl* and *Magon* joined with the *Botba* and *Mentor* in an engagement with three large German destroyers, and had five wounded by a shell. The enemy were hit and retired under their batteries.

On the smaller boats fell the brunt of light vidette work in

the waters to the eastward of Dunkirk. A constant patrol at night was maintained by them in the West Deep throughout the war. This was our nearest patrol to the enemy's ports. While on this work the *Etendard* was torpedoed, and all her crew drowned, and the *Notre Dame de Lourdes* was badly damaged by gun-fire, but taken safely to Dunkirk.

Another action in the West Deep took place between the enemy's boats and the *Capitaine Mehl* commanded by Capitaine de Frégate Guy, the *Bouclier*, Commandant Bigot, the *Magon*, Commandant Thouroude, and the *Enseign Roux*, Commandant Mouget. The captain of the *Bouclier* and Enseign de Vaisseau de Curzon and eight of the crew of that vessel were killed, and Enseign de Vaisseau Peyronnet and ten others were wounded. This was one of those quick, sharp night encounters in which it was impossible to estimate the damage done to the enemy.

In August 1915 an enemy's destroyer was sunk by the *Oriflamme* and the *Branlebas* off Westende. The latter destroyer struck a mine off the Nieuport buoy on October 5th of the same year. The *Aventurier* engaged the German destroyers together with our coast patrol on June 8th, and had three men wounded. On October 19th, 1917, a sea-plane dropped a bomb on torpedo-boat 321, which exploded a lance-bomb on board that vessel, doing considerable damage.

These were some of the local encounters which took place, but there were other incidents. The boats in the West Deep on several occasions afforded help to our sea-planes when in trouble.

On the French coast, the most troublesome sector in the Channel was that between Boulogne and Havre. Here the coast route was flanked by the rapidly broadening stretch of water between the English and French coasts, where the latter falls away sharply to the southward at Boulogne. The arrangements for the traffic line could not be so simple as on the English side, as vessels were not available to protect the very

much smaller number of ships that used the French side. The result was that occasionally steamers, sailing-vessels, and fishing-boats were attacked by submarines. Altogether six such attacks were made, the most serious involving the sinking of two steam and eight sailing fishing-boats, by a submarine on March 1st, 1917. These vessels had strayed out rather far without escort. One other small coaster was sunk, and the *Sussex*, a mail-steamer, was torpedoed, but brought safely into Boulogne. This incident led to the Dieppe boat being escorted whenever mails were on board her. To cope with these attacks, the coast traffic was convoyed by a French destroyer, and the fishing-boats confined to a more protected area. This put an end to the trouble.

Six actions took place with submarines off this part of the coast. One submarine, *U.C. 61*, stranded near Wissant, not far from Grisnez, and was blown up by her crew, the vessel being captured by a detachment of Belgian cavalry resting near the place. This is the second occasion in history of a man-of-war being captured by cavalry.

The possibility of the blocking of the harbours by the enemy had to be kept in mind. A dash at Dunkirk might have succeeded, but destroyers were always off that port and should have accounted for any vessels trying to block. At Calais the problem would not have been so difficult for the enemy, as the waters to the northward were not closely patrolled, and a vessel dashing straight over the shoals at the eastern approach might have reached the harbour. On dark nights, therefore, I kept one 12-inch monitor anchored off Calais with orders to fire at every vessel seen entering by the eastern entrance, which was closed to normal traffic. The anchorage was a bad one, being much exposed in south-westerly weather, but this had to be put up with.

The visit of H.M. the King to the coast was an event to be recorded, as the air-stations, monitors, and siege-guns were inspected by him. Plate LXXIII shows the King in conversation with certain pilots in the R.N.A.S. who had just returned

from the Somme after strenuous work with the Army. The inspection will always be remembered by the officers and men of the Dover Patrol who were then at Dunkirk.

The work of the R.N. siege-guns requires a brief review. Originally landed by Rear-Admiral Hood as soon as the Germans had been checked at Nieuport, the battery consisted of two 6-inch guns and one 9·2 gun on a railway mounting. Captain H. Halahan was in command. Lieutenant Shoppee and Lieutenant Tower were observing officers. The main observing-stations were situated in Nieuport town and Rams-capelle. Plate LXXIV shows all that was now left of the church tower, usually known as Shoppee's Tower. Starting as a fine square building with stone steps inside it, it was gradually demolished, Lieutenant Shoppee flitting down as it was reduced until the stone steps were ruined. Then a rocket and line enabled a ladder to be pulled up, and the post continued to be used right up to the end of the war. A second observation-post was started in Nieuport, and a concrete tower was built inside a sand-dune commonly known as Duncan's Tower, after the Canadian sergeant who constructed it. Another observation-station was at Ramscapelle, which could only be approached in the dark.

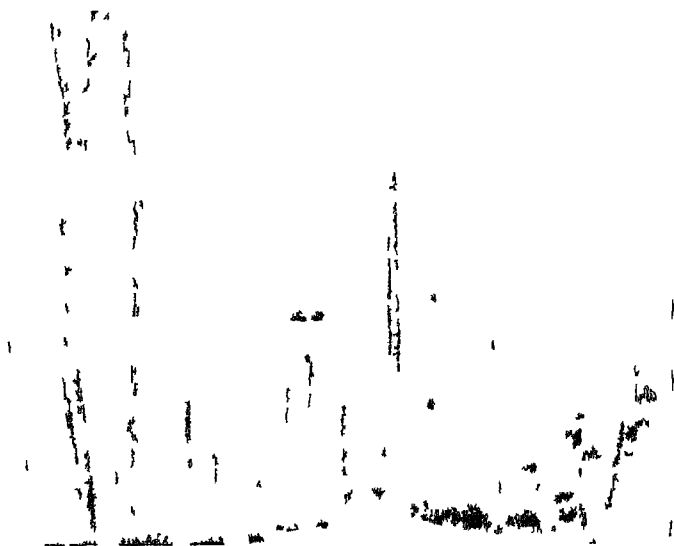
In 1916 I landed the four 9·2-inch guns from the monitors. Three were landed first. One was placed in a concrete casemate, the other two were placed in the open until emplacements could be built. The emplacements were called the Barrington and Eastney.

The sector at this time was fairly quiet, but, owing to the proximity of the gun-positions to the enemy lines, the work could only be proceeded with at night, as we had already had an experience which showed the enemy were on the look-out for new positions; and, once discovered, it would have been an easy matter to demolish them in a few hours. At that time, and indeed all through, the enemy had a very pronounced superiority of guns, especially heavy ones. He had, among others, three or four 11-inch howitzers, and



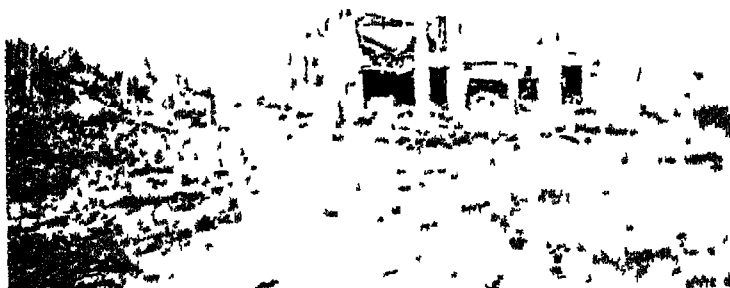
INSPECTION OF ROYAL NAVAL AIR FORCE AT DUNKIRK BY H.M. KING GEORGE VI

PLATE LXXIII



THE OBSERVATION TOWER AT NIFUNORI

Showing the ladder on the top of which the observer used to stand to observe the burst of shell



THE REMAINS OF THE MAIN SQUARE AT NIFUNORI

PLATE LXXIV

later on a 17-inch howitzer, whose range enabled him to concentrate on any of our positions.

So far as naval guns were concerned, it is safe to say that, until the British took over the Nieuport sector, the Germans had a superiority of at least twenty to one, and as, when the sector got more active, the almost daily artillery duel was confined to concentrated fire on the new British batteries, the superiority was more than ever in favour of the enemy. The building of Eastney emplacement took about a month, and was no easy task; the material had to be brought from Calais by train to Coxyde, dumped there, transferred to lorries, and dumped again by the roadside a hundred yards from the gun-position, to which it was conveyed on Decauville trucks. All this had to be done during the hours of darkness and along roads that were at regular intervals swept by the enemy's field-guns, to say nothing of the fact that they were often impassable as a result of the activities of the heavy howitzers already mentioned.

Towards the end of October 1916 the sector was stirred into unusual activity by the arrival of a detachment of our Royal Engineers, who came to try the effects of a new gas on an unexpected part of the line. The enemy retaliated by a bombardment of gas-shells within a few days of our attack, and from that date the sector never resumed its quiet aspect, but got more and more active until our own troops took over that part of the line in June of the year following. The increased liveliness just mentioned soon made it obvious that guns in the open as near to the enemy's lines as ours were no good for stationary warfare such as we were engaged in, as the two 9'2's in the open were being bombarded almost daily with from 400 to 500 rounds of 5'9-inch, and, although the guns were not actually put out of action for good, the sand-bag emplacements were destroyed faster than we could repair them, the elevating and training gear was put out of action on several separate occasions, and finally the ammunition-pits were stove in and the breech mechanism of both guns rendered

useless by being struck by pieces of shell. It was, therefore, decided to build concrete gun-pits similar to those of Barrington and Eastney, and a suitable position was found a few hundred yards inland and abreast of the 6-inch gun-pits, and these new double pits (named Carnac Battery) were completed by Christmas Day of 1916.

The year 1917 commenced, therefore, with four 9·2-inch and two 6-inch guns mounted in strong concrete casemates with sufficient sand on the top to make them secure against anything except two or three direct hits in the same place from a very heavy shell, say of 11-inch calibre and above, or a chance shot coming inside the embrasure.

Towards the end of 1916 some important changes took place in the personnel of the siege-guns. Two of the active service officers, Lieutenants Tufnell and Caswell, were recalled to the Fleet, and it became an understood thing that casualties among both officers and men were to be filled from the R.N.R. or Royal Marines—an increase of anti-submarine craft making it imperative that no trained regular naval officer should be employed on work that could be performed by a semi-trained one or a marine. We were, therefore, reinforced about this time by Lieutenant-Commander King, R.N.R., who took charge of the 6-inch guns, and Sub-Lieutenant Donovan, R.N.R., who came out as second-in-command of the Carnac Battery. Several marine officers joined a little later on to relieve Lieutenant Lord Maidstone and Lieutenant Shoppee as observers. We were also allowed a naval paymaster—Staff-Paymaster Williams—who, apart from his clerical work, which was not much, acted as observer, plotter, or did with ability any executive work that came along.

About this time, too, Major Charles Flint relieved Captain Wilson as C.O. of the Canadians, and Commander Bickford after this change spent most of his time with the guns, he and Major Flint between them doing all the mounting and shifting of guns, and it is impossible to overrate the assistance of these two officers, and the Canadian detachment generally. Their work

was always done during darkness, and later on when preparations against time for operations were in progress, no enemy bombardments either of shell or gas were allowed to interrupt the making of new positions or the mounting of the guns, some of which, when the 4th Army took over the sector, were actually within a few hundred yards of the enemy outposts. Commander Bickford would work for days and nights on end without apparently taking any rest. It was truly said of him that "he went forty-eight hours to the gallon."

From the beginning of 1917 till about the end of June the siege-gun unit played an important part in the operations of the coast sector. The French had no guns suitable to counter-battery the enemy's long-range naval guns, and consequently our guns were frequently and extravagantly used both for counter-battery and destructive purposes. The enemy soon realised the position, and, with the suitable shooting weather of spring, it is a fact that no one day was allowed to pass without one of our batteries being the object of a destructive shoot. The accuracy and weight of the enemy's fire soon began to take effect; Barrington received a direct hit from an 11-inch howitzer which cut the gun clean in two, and within a few days the 9·2-inch truck-gun also received a direct hit from a 5·9-inch. From this time onwards it may be said that the foremost 9·2's were never of any real service, for, although they were in action at intervals, they were immediately bombarded, and as a rule put out of action for at any rate some days, or even weeks; and it was a recognised thing that, after each firing, they would be put out of action for a period. One of the two 6-inch gun-pits was completely destroyed, and the gun was mounted in a new and what seemed an impregnable position farther back. After two shoots, however, the gun was completely wrecked, and the pit was not used till a 7·5 was mounted in it later on in the year.

Within a very few weeks Carnac Battery alone remained in action, and it was almost a standing rule that it received a

concentrated shoot on every fine day. The enemy, as a rule, used to give it anything from between 300 to 600 rounds of 5·9-inch, and the shooting was extraordinarily accurate. As many as forty or fifty hits would be obtained on the gun-pits in one day, though, of course, the amount of sand on the concrete pits prevented any serious damage being done. The enemy at this period had the better of it in the air, which facilitated his ranging.

It must, however, be borne in mind that these guns were not used only for defensive purposes. Carnac Battery carried out many destructive shoots on enemy batteries, and the somewhat old naval pattern guns were found to be most accurate and consistent at ranges between 8,000 and 12,000 yards. They also lasted extremely well, standing as a rule about 700 full charges. The main difficulty was that the French had few guns suitable for counter-battery work, when the English guns were engaged on destructive shoots, and consequently the Germans were able to bring concentrated and unmolested fire on the battery carrying out the operations.

April was an unlucky month for our naval guns, as Carnac received a heavy shell in the right pit, wrecking the gun and killing or wounding all the crew—among the killed being Sub-Lieutenant Donovan, R.N.R. The French coast batteries had their share of bad luck, as a chance shot set fire to their cordite, and two gun-pits were completely burned out, together with the crews, about thirty men in all. The French were most appreciative of the work of the R.N.S.G.—Carnac Battery being specially mentioned in the Army Corps orders.

On April 1st the enemy made an attempt to take the part of the line on the other side of the Yser Canal—an operation they performed successfully later on when the British held the sector. The gas alarm was given about 1 a.m. on the morning of April 1st, and it was followed immediately by a heavy bombardment. Fortunately the wind was not quite down the line, and our guns' crews were able to reach their batteries without any casualties from gas, though the French infantry

suffered severely. The enemy came over the top about 4 a.m., and took the front line trenches, but the French, with extraordinary dash, re-took them within a very short time, and the enemy's operations were a complete failure, though prisoners stated that it had been intended to be a big affair, and the most minute and thorough preparations had been made.

In May and June the sector gradually became much more lively, as, without any attempt at secrecy, the British began to make preparations for taking over that part of the front. Roads and camps were shelled at all hours of the day and night, but the siege-guns had a much easier time of it, as, of course, there were many more targets for the enemy to fire on, and in any case we were asked to save our guns as much as possible, as they would be required for long-range targets when the final operations took place. Eight naval 7.5-inch guns were added to the forward command, to mount which, under the conditions existing, was no easy task. Gas attacks and bombardments were daily occurrences, and, in view of the closeness of our batteries to the enemy's front line, our casualties were heavy. During the few months in which we were with the 4th Army, out of the normal establishment of the R.N.S.G. of 8 officers and 150 men, we lost 3 officers killed and 3 wounded, and the casualties among the men were over 50 per cent. The positions of our camps being well known to the enemy, they came in for shell-storms continually; but it was noted that, when once again we got command of the air, the enemy never attempted to shell gun positions, the majority of losses occurring in and about the camps, rather than in fighting the guns. For the first time our artillery was, so far as quantity is concerned, much superior to that of the enemy.

On July 12th at 4 a.m. 15-inch shells from the Hindenberg Battery burst around Carnac Battery and Barbara Camp where the guns' crews lived. Also the first shell fired by Tirpitz on that day went clean into the dug-out where the crew of one of Carnac's guns were living, but luckily they had left for the gun-pit. Our casualties were heavy, and the use of

mustard-gas on that and subsequent days accounted for a large percentage of our losses. Carnac Battery fired all through the day and night of July 12th, our heavy guns farther back not being asked to shoot. The British Army remained in the Nieuport sector until late in the year, but nevertheless, after the abandonment of the coast landing, the rôle of the R.N.S.G. soon resolved itself into retaliation strafes on roads and villages, and, even after the French reoccupied that part of the line, the siege-guns never again played the important part they did earlier in the year, when they were the only guns in the sector with long enough range to allow them to compete with the long-range naval guns of the enemy.

TO DUNKIRK

Town of stirring memories, invincible you stand,
With your gallant folk fulfilling history's demand.
Though a target for the forman every night you are,
You have shown a courage worthy of the brave Jean Bart.

'Mid crash of bombs and bursting shell, never yet dismayed,
Through the tempest of the "bombing" calmly unafraid,
Not a house is left unharmed, for each one bears a scar,
People live and die in manner taught by brave Jean Bart.

Order of St. Louis brightly shone upon his breast,
Croix de Guerre and D.S.C. your fortitude attest,
Listen! from Valhalla faintly echoing afar
Proudly rolls the "Bravo! bravo!" of the stern Jean Bart.

CHAPTER XVII

C.M.B.'s, M.L.'s, SUBMARINES AND SMOKE

The coastal motor-boat, its uses and limitations—High speed and invisibility—Checks on impatience for action—An incident off Zeebrugge—A narrow escape—Firing torpedoes inside the Mole—The arrival of motor-launches—Experiments with smoke-screens—Exploratory sweepings for mines—Submarines at Dover—A time of weary waiting—Spotting for the monitors—The best colour for submarines to avoid detection below water.

A HISTORY of the Dover Patrol would be incomplete if no mention were made of the small craft which, gradually evolved to meet the unexpected demands of the war, eventually took no mean share in the work at sea. In particular, I must say something of the coastal motor-boat—or C.M.B.'s as they were called for short—and the motor-launches—M.L.'s—both of them fine products of the development of the internal combustion engine which gave us not only the motor-car and the motor-bus, but also the aeroplane and the airship.

The C.M.B.'s were twentieth-century torpedo-boats: they were of high speed, small size, and light construction, but, owing to their small size, they had bad sea-going qualities. They ranged in length from forty feet upwards, were designed for a minimum speed of thirty knots, and were armed with one torpedo each, which was discharged aft and tail first on the assumption that the fast-travelling boat would be able to steer clear of the torpedo after it had been discharged.

As every seaman knows, it is quite impossible to maintain high speed in any sea without length of vessel, the underlying principle being that the ship should be so long that she will not drop her nose into a hollow; if this happens she tries to go through the approaching wave instead of riding over it, with

the result that she encounters a wall of water, a large portion of which is taken in over her bow. The velocity with which the water comes on board is at least equal to the speed of the ship, and serious damage is the result. Not only did this apply to C.M.B.'s, but, in addition, as their trim when steaming at speed was always with the bow up and stern down, they jumped from sea to sea, landing with a thud on the water, which, when accentuated by particularly unfavourable conditions, was most injurious to them.

They were, in fact, smooth-water boats. Their speed was little more than that of the German destroyers in smooth water, and well under that speed in any lop. Since their torpedo was discharged tail first over the stern, immediately its propellers touched the water, it began to be propelled ahead in the direction of the boat that had just discharged it. The boat, therefore, had to be steaming at a high rate of speed, and to turn immediately in order to avoid her own torpedo. Such a method of discharge might appear an extraordinarily inefficient one, suggesting that the designers went out of their way to court trouble; but there are good technical reasons why this idea was a particularly brilliant one, and it was the method of discharge that made the fast-skimming boat a practical torpedo craft.

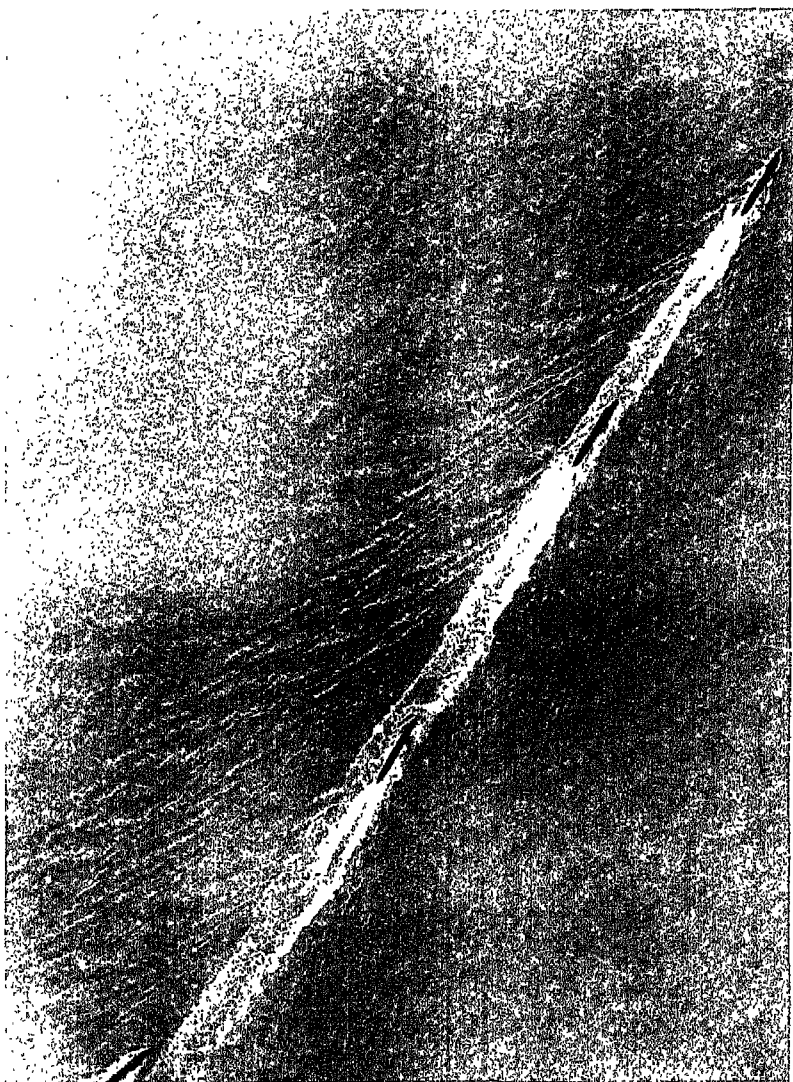
It may appear that, having apparently damned the C.M.B. from most practical points of view, there is little more to be said; that is not so. The great value of the C.M.B. lay in the combination of high speed and invisibility due to small size. No better example of the value of special-class vessels exists than the C.M.B., provided that its limitations were realised and patience in its use was exercised. As a weapon in the armoury of an Admiral, the C.M.B.'s possessed great potential value, provided their general unreliability and the fact of their special use were recognised.

Now young officers in command of such vessels naturally thirst for opportunities of distinguishing themselves. They long to be at the enemy, or looking for him whenever the

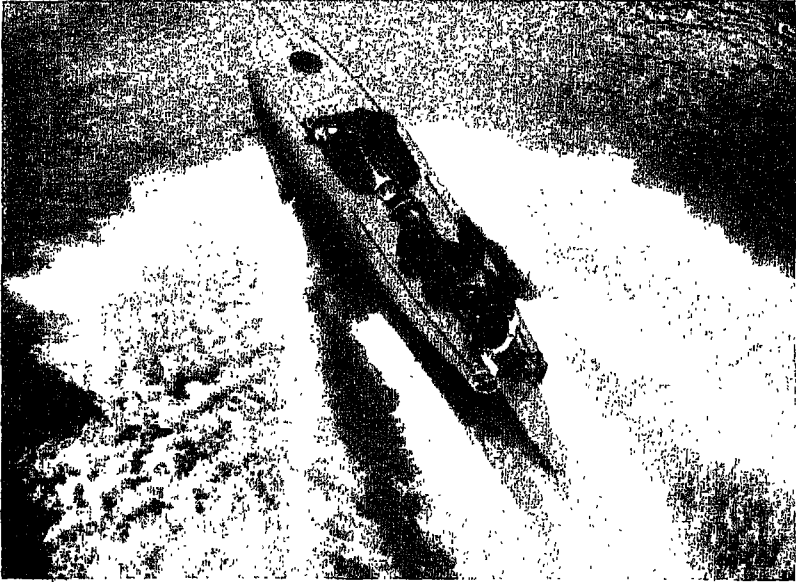
weather is suitable. Such a spirit is most laudable, but it cannot always be indulged. War is a serious matter, and is not waged for the benefit of old or young officers; their participation in it is a mere incident; they and their vessels have to be subordinated to the general strategical conditions. There is an *art* underlying the use of all vessels, particularly small craft. Often the interests of the country are best served by keeping the vessels idle. This is irksome to their crews, and not their idea of war, and naturally they chafe under enforced inactivity. Let me explain a little more fully.

The Coastal Motor Boats were useful mainly at night. In day-time—and bright moonlight nights may be looked on as daylight—the German destroyers could hunt them down. On very dark nights the visibility is so poor that they were not suitable for purposes of attack, as craft low in the water like C.M.B.'s cannot see their prey. The best nights, therefore, on which to use the boats were about the first and last quarters of the moon. Their functions were twofold—to attack enemy vessels and to lay mines. The best chance of successful attack on the enemy's vessels was on the first occasion that the boats were used, when the enemy would be quite unprepared for a new class of attack. As soon, therefore, as the boats had had a little practice in working off Ostend, an attempt was made on the Zeebrugge destroyers in conjunction with the R.N.A.S. The idea was to have the C.M.B.'s in the vicinity of the Mole; then to bomb it heavily from the air; and then that the C.M.B.'s should attack any vessels that might put to sea to get clear of the bombing. The attack was carried out; everything happened as was anticipated, and one destroyer was sunk, another being damaged. It was an operation thoroughly well carried out, that did the officers and men good and served the interests of the country.

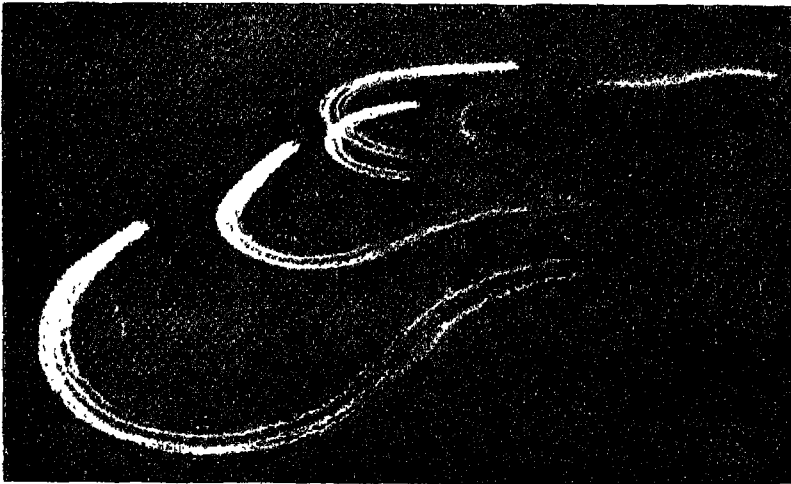
About this time boats were often sent, usually in pairs, to patrol in the vicinity of the approaches to Ostend and Zeebrugge. On April 30th, 1917, after steaming to and from the coast just to the eastward of Ostend harbour for about an hour



GERMAN DESTROYERS RUNNING AWAY FROM THE AEROPLANE THAT OBTAINED
THE PHOTOGRAPH, THINKING SHE CARRIED BOMBS—BUT SHE DID NOT !



40-FOOT COASTAL MOTOR-BOAT RUNNING AT FULL SPEED.



A DIVISION OF C.M.B.'S AS SEEN FROM THE AIR.

Observe how the washes of the boats show up while the boats themselves are almost invisible.

PLATE LXXVI.

and a half, an air raid commenced over the town, and the boats proceeded closer inshore, keeping a careful look-out for any vessels leaving or entering. An enemy vessel was sighted against the moon, possibly a mile distant, by Lieutenant-Commander Welman in No. 7 C.M.B. When the enemy was about half a mile away, he, in company with No. 13 C.M.B., stopped to obtain as good an idea as possible of the ship's course and speed. He then proceeded to draw off in order to increase speed and attack from a favourable position. The C.M.B.'s were, however, observed, and fired upon much earlier than had been expected, and this gave the enemy time to turn away and increase speed. By this time one boat was on each quarter of the enemy, working out on to the beam, and it was obvious that he must turn sooner or later, as he was heading shoreward. He turned to starboard under considerable helm, and No. 7 fired a torpedo at about 400 yards' range, and observed a large yellow-red flash, immediately surmounted by a T-shaped cloud of heavy black smoke. By this time, as is always the practice after firing at close range, they retired at full speed. On hearing the explosion and feeling the bang on the boat caused by it, No. 7 slowed down, and, as gun-fire had now ceased, prepared to return to the vicinity. Just after turning, the position of the torpedoed vessel was indicated by smoke, after which a red glow was observed which seemed to disappear below the surface accompanied by a cloud of smoke or steam. Shrapnel from the shore batteries, however, made it prudent to withdraw.

On May 2nd an incident occurred which might have had disastrous consequences for the C.M.B. flotilla, but it is one which also had its humorous side, which, however, the participants could never appreciate! Four C.M.B.'s started off to hunt for a destroyer that was supposed to be patrolling off Ostend. All went well until the boats suddenly and unexpectedly found that they themselves were being hunted by four large destroyers which were close upon them.

Being too close to turn ¹ and attack at once, they scattered like a covey of partridges in accordance with the orders they had previously received. No. 7 C.M.B. was the one that the enemy selected to follow, and she was chased well away to the westward before she shook off her pursuers, having by that time two bullet-holes in her carburettor, three in the induction-pipe, one in the water-jacket of the engine, and two in the steering-compass. She was, therefore, in no condition to turn and try to torpedo her pursuers. The captain of No. 2 was wounded by a bullet, which practically put the boat out of action. The engine of No. 10 was running badly, and she could not overhaul the destroyers after she had shaken them off. The steering-ropes of No. 13 carried away and she proceeded to turn circles through the enemy's lines. Twice she circled right in among the destroyers, both sides firing revolvers at each other; she fired her torpedo, but it ran under the destroyer. After the second circle, when farther away from the enemy she wisely stopped her engine and was lost sight of by him. The broad white track left by the boats undoubtedly attracted the attention of the destroyers, who got in too close before being observed to allow time and distance for the large turn requisite to bring the C.M.B.'s bows-on to the destroyers, which was necessary before an attack could be made. Then the machine-gun fire put two boats *hors de combat*; one other boat had the time of its life; and the fourth had a "missing" engine. But it was a useful incident, if only to show the younger brains that success is not achieved without experience. After this date I did not wish to practise the enemy's patrols just previous to our launching the Great Landing, and therefore I closed down work with the C.M.B.'s except to lay mines off the occulting buoy near Zeebrugge, which accounted for at all events one German vessel.

On August 22nd, 1917, when the hopes of the Great Landing

¹ These light, fast craft took a very large circle to turn in. To have attempted to turn quickly would have had the same effect as turning a corner too sharply in a dog-cart, namely, to capsize.

were fading, I sent the C.M.B.'s to fire torpedoes on the inner side of the Mole at the place at which the destroyers usually lay. This is one of the only two things I have ever regretted, so far as operations are concerned, during the time I commanded at Dover.¹

However, the young officers in the C.M.B.'s were thirsting for glory, and a safety-valve was desirable, so I told the Commodore to send them to fire at the inside of the Mole. As might have been expected, the exact spot was not hit, and no damage was done except to ourselves, for the incident pointed out to the enemy the undefended nature of the inside of the Mole. He immediately proceeded to lay an obstruction from the end of the Mole to the shore, leaving only a gap near the Mole. It was probably in this obstruction that the *Thetis* fouled her propeller during the blocking operation. This was exactly one of those operations that an Admiral should not sanction; it was sparring instead of hitting hard. It is a good maxim never to practise the enemy by useless operations; either hit hard or leave him alone, even if the young gallant officers in small craft do chafe and fume at inactivity.

The difficulty in attacking the Mole lay in the enemy destroyers not being visible against the dark background of the Mole, and, as the C.M.B. torpedoes had to be fired when the boats were going full speed—33 knots—there was nothing by which to judge when to turn in approaching the looming blackness of the Mole. There was no clear silhouette against the sky, as in the attack on a destroyer at sea. The shots, therefore, had to be blind ones at an estimated spot.

Often when good opportunities for the use of the C.M.B.'s occurred, such as an attack on the destroyers homing from the North Sea, the weather prevented their use. They were absolutely unreliable, from a general service point of view, from the

¹ My second regret was not to have thought of designing a special vessel—half destroyer, half submarine, but chiefly submarine—running awash, and with torpedoes specially designed to run in shallow water, to torpedo the lock-gates at Zeebrugge.

very nature of their construction; but that could not be helped. They always did well within their limitations. Their crews were beyond praise in what they actually accomplished and in their efforts to navigate in medium weather, in spite of the inherent disabilities of their boats. On more than one occasion C.M.B.'s were sent to try and save aviators whose machines had fallen into the water off the coast. Once the C.M.B.'s were attacked by destroyers while so doing, and No. 1 C.M.B. was sunk by a direct hit, and her crew captured. I stopped this practice if the air-craft fell in the water anywhere close to the enemy's coast, as it was merely waste of vessels, and like the old children's tale of rolling successive cheeses down the hill to try and bring back the first.

In addition to the C.M.B.'s, we had motor-launches. These craft first came to Dover in November 1915, under the command of Commander Hamilton Benn, M.P., R.N.V.R., a very fortunate selection so far as the flotilla was concerned. At first there seemed to be no really good use to which they could be put. They were fine-weather boats of only 1-inch wood planking and 1½-inch timbers; they were too short and low in the bow for bad weather work, so that they could not be relied on to take regular turns on patrol. However, having them, I tried to fit them in somewhere, and they became a most useful adjunct for burning our smoke-screens. When they first arrived, experiments to obtain a smoke-screen were in full swing.

So far we had designed some good burners for phosphorus, and these were placed in old rowing-boats and towed by any vessel available. In order to obviate having men in the boats, an electric circuit was fitted, which fired port-fires over the phosphorus to light it at the required moment. Phosphorus—that is to say, white phosphorus—however, was very inflammable when exposed to the air, so that some means had to be devised to prevent ignition until the required moment. This was effected by keeping the phosphorus covered with water, and fitting a drain-tube to the bottom of the container.

From the drain-tube an india-rubber tube was taken up outside the container, with its end above the level of the water inside. At the same time that the port-fire was lighted the twine holding up the tube was burnt through, the tube fell with its open end below the bottom of the container, and the water inside drained out. As soon as the water fell below the level of the phosphorus, the port-fire lighted the phosphorus, and the burner soon got into complete action. As the phosphorus burned, some melted and ran out into the drain-pipe, solidifying there and stopping further escape. The whole arrangement was primitive, but would have been a fair makeshift.

I intended to use this device for the landing inside Ostend. Once I tried it at a bombardment in Middle Deep, and as the boats were well within reach of assistance of the M.L.'s towing them, I had two men in each boat. The two lots of boats were towed by Commander Benn in *M.L.* 55 and Lieutenant Dawborn Young in *M.L.* 110. The burners, however, were too hot for the men in the boats, and they had to clear out. The arrival of M.L.'s in numbers naturally led to our putting the burners on board these vessels, where they could be easily manipulated. They were most successful. No complicated method of ignition was necessary, and no water required in the burners, as the phosphorus could be kept under water in receptacles until required, and then fed straight into the burners.

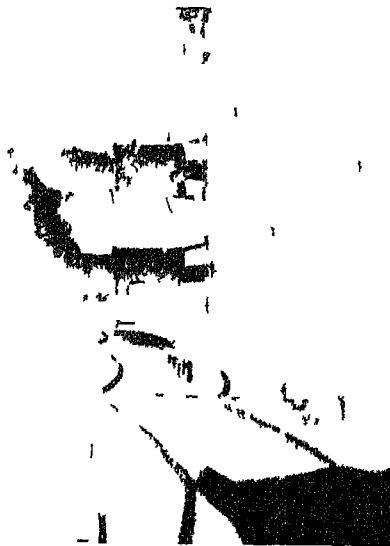
Experiments with burners continued without intermission from 1915 to the end of 1917, and, if I had remained at Dover, would have gone on to the end of the war, as they were capable of progressive improvement. In day-time the smoke-screen was perfect. At night-time the phosphorus emitted flame which was visible through the smoke unless the stoking was done very carefully. The difference between the smoke-screen by day and by night was most instructive. By day, the cloud of smoke was absolutely impenetrable to vision; by night, a light could be seen through it, except at its most dense portions,

showing that the screen effect was almost entirely due to reflection of light from the particles of smoke, and not to the small particles of solid matter forming a screen impervious to direct rays.

Several methods were tried to prevent the light showing through the smoke. Careful stoking was the best precaution. If the phosphorus was broken up below the water into fragments of not more than one cubic inch and then fed into the burner, the flame could be kept down. A rotary feed was devised which fed the small lumps without exposing a direct opening from inside the burner to the air. Several types of funnel were made, T-shaped with baffles, etc., to prevent direct flame being visible; but these were discarded, as they condensed the phosphoric acid instead of letting it pass freely as smoke. I did not mind the general lurid glare given to the clouds or to the smoke by the flame burning low down in the funnels, provided direct flame was kept down, as the former only mystified the enemy as to the exact position of attack. The smoke-screen, both for the Great Landing and for Zeebrugge, would have been three miles long, and the attack at isolated points only, so that no harm would have been done. On the whole, therefore, I preferred phosphorus, if carefully fed, to other methods.

One other method I was on the point of trying was water-cooling the burner-troughs. This would have had the advantage of adding steam to the smoke, while delaying the rate of burning and reducing the glare; but it would also have meant heavier burners.

Chlor-sulphonic acid was also used in the exhausts of the M.L.'s; it was a good alternative, but its use depended on whether sufficient supplies could be obtained. Commander Brock fitted the apparatus in an M.L., and I was prepared to adopt it generally for night-work in addition to the phosphorus if supplies were available. Chlor-sulphonic sprayed on the top of the burning phosphorus also gave good results. The French smoke was also tried and proved satisfactory, so we had many



EXPERIMENTS TO OBTAIN NEUTRAL THIN LAYERS
BY MIXING BLACK AND WHITE SMOKE



STARTING AN OVERHEAD SMOKE SCREEN FLOWING B.
A KITE

The view is taken looking straight up into the kite. The lower black and white spot is the kite, the black spot, with the smoke coming from it is the burner

PLATE LXXVII

alternatives; but I was bent, if possible, on using phosphorus on account of its many other good points. Compressed air-pipes were also fitted to the phosphorus-burners from the air-reservoir in the M.L. This gave a considerable increase of smoke so long as the air lasted, which was for about a quarter of an hour—a useful addition in case of emergency.

The M.L.'s carried their burners in the bows, as the wind was always aft in approaching the shore, and the smoke was, therefore, carried clear of the officer and helmsman, but there was also a burner in the stern for use in retirement. A whole chapter could be written on our wrestlings with smoke and the numerous devices that we tried. For instance, attempts were made to make a ceiling of smoke over the monitors when they were firing in order to hide the fall of the enemy's shell from the German spotters. This was done by kites towed by destroyers. The early attempts at kite-flying with burners were full of incident. Plate LXXVII shows the kite with the burner below and a smoke-screen in process of formation. These experiments were still in progress when I left Dover, and it was then too early to say if the system would prove of practical utility. The advantage was that the ship could be screened with the wind coming from any direction, whereas with the ordinary smoke-screen the wind had to be on shore. Plate LXXVII also shows a view of the burners. In this particular case black-and-white smoke was being burnt to produce a neutral tint—the outcome of a suggestion of Admiral Sir David Beatty to throw a screen behind the ship of such a colour that the ship would be invisible against it. This, however, did not defeat aircraft spotting. In all these trials the M.L.'s were most useful, and they accompanied the ships in all their bombardments in 1916 and 1917.

When the Great Landing was in contemplation I arranged for Captain Colin Maclean to be appointed to take charge of the training of all the ninety M.L.'s allocated for our smoke-screen. In order not to deplete the other bases for too long, divisions were sent to Dover to have burners fitted, and to

be trained, and then were returned to their own ports. In this work Captain Maclean was quite invaluable, giving instruction in station-keeping and the general working of the boats together in divisions. There were few officers from whom I parted with greater regret than this able and gallant officer, who was of the greatest assistance to me.

On occasions, when the flank of a division of smoke-boats had to be screened from observation, owing to the wind blowing the smoke clear of the flank boat, smoke-buoys were used. These were phosphorus buoys, burning for about twenty minutes. They were dropped to windward, trailed the smoke down to hide the boats, when required; another good point was that, as they flared right royally, they would have attracted the fire of the enemy.

In all coastal operations at night, such as the Great Landing, the attacks on Zeebrugge, etc., such buoys would have been dropped all along the coast where no operations were in progress, but where the batteries might have ranged the main operation, so as to mystify the enemy as to the point of attack, and also to give him something harmless to fire at.

Every day during 1917 after the barrage on the Belgian coast had been laid, one division of M.L.'s at Dunkirk were ready to go out and form a screen for the monitor on patrol, if the weather allowed firing at Ostend to take place.

The smoke-screen work was by no means the only duty of the M.L.'s. Very soon after the arrival of the first boats we devised a method of fitting a light wire-sweep for exploratory sweeping. In other words, we ran a couple of M.L.'s with a light sweep over certain routes to see if there were any mines. They were of themselves too light actually to sweep up mines, but they could easily tell if they caught any in their sweep. Their speed enabled the sweep to be easily carried out, and their light draught made them especially safe vessels for the purpose. They could not, however, be relied on, and, as mine-sweeping at Dover had to be done in fair weather and

foul, they could merely be looked upon as auxiliary to the mine-sweeping organisation.

On patrol the M.L.'s were not of much value, as here again they could not be relied on to take a definite section. In reasonably fine weather they could go out, but their natural disabilities of noisy engines, low freeboard, and inefficient armament handicapped them greatly, and I never considered that their use for this purpose compensated for the wear and tear of the vessels and their personnel.

On several occasions they were valuable in saving life after accidents, as, for instance, when the *Anglia* was mined and they brought in seventy-two persons; and also when they rescued seventy-eight survivors from the *Maloja*. The officers and men always responded nobly to every call. Largely officered by amateur yachtsmen, a number of their crews had had no previous sea-experience. Fortunately, the crews contained a nucleus of Scotch and East-Coast fishermen, than whom there are no better men in the world for small craft. The officers were all given a short course in navigation, gunnery, and signalling at Greenwich and Portsmouth. The crew and engine-room complements were also given courses of training, but the navigation required was that of the amateur yachtsman who can read a chart, use parallel rulers and compasses, and take in the pilotage of a harbour by eye, even as in the old torpedo-boats we used in bad weather to fold the chart along the course and a parallel fold through the compass to find the course! The imprint the M.L.'s left on my mind is of boats invaluable for smoke, and possessing that general utility that attaches to light-draught vessels with high speed; they were only too eager to work, but their great heart was apt to over-estimate their physical capacity. To Commander Hamilton Benn they owed their discipline and much of their success.

I must add something about the submarines at Dover. They had a weary time, and not much fun. Their chief function was to protect the Straits in case of a raid by the cruisers of

the enemy. Such a raid never took place, and, therefore, they were deprived of their only reasonable objective. As can be imagined, their use for any other purpose was always overshadowed by their passable resemblance to the enemy's boats. It would have been most unwise to introduce the slightest doubt into the minds of the patrols as regards attack on submarines. Every submarine or periscope had to be attacked the moment it was seen. Challenging signs and counter-signs are all very well if they cannot be avoided, but for real work in destroying submarines there is nothing like instant action without second thoughts. Such action can only come with the knowledge that everything seen is an enemy. Therefore, our submarines were never allowed out except under certain definite restrictions. Had a cruiser raid taken place, the French submarines and ours would have divided the breadth of the Straits between them to attack and sink the enemy. We had several false alarms and the boats prepared to go to their appointed positions, but they were invariably disappointed. The disappointment was entirely theirs, I might remark, as I had no desire to see cruisers raid our thin defences.

When the Belgian Coast Patrol started in 1916 I used both the French submarines and ours to patrol the line at night. Gradually the French boats dropped out, as their torpedo discharge did not enable them to fire torpedoes when on the surface, and, unless torpedoes could be fired instantly, little chance of attack at night could be expected. Only on one occasion during several months did a submarine sight anything, and this was a surface vessel steering westward, her appearance being too fleeting for attack. To avoid being seen and attacked, the submarines were escorted up to the edge of the patrol-line, arriving at dusk, and were met again in the early morning and escorted back again to Dunkirk. The escort, of course, answered for the *bona fides* of their charge. This night-patrol was not easy or pleasant work on a line usually badly lighted, with explosive nets flanking one side,

and the Hinder Shoal the other ; but it was war-time, and anything was preferable to the inactivity of Dover harbour.

A somewhat similar duty was carried out by the boats on the barrage-line of nets between the Goodwins and Snou Bank. Here the submarines were fitted with occulting lights and lay at moored buoys to resemble light-buoys. But the C. class suffered from having only bow tubes, so that they were never ready to fire at an enemy whose only bearing, when observed, must have been approximately on the beam. On the only occasion when an enemy was sighted, before the submarine could slip and turn bow-on to the enemy, the latter had disappeared in the darkness. The escort to and from their positions was elaborately arranged, but in this case the boats had to leave the harbour, and also their positions on the barrage-line during dark hours, so as to keep the fact of their lying on the barrage secret even from our own patrols.

In the early days, before we had perfected our methods of control of gun-fire by aeroplane, and after the first bombardment of Zeebrugge, when the observation stations proved useful, I got two old A. class boats and fitted them up as observation-stations, so that they could go in submerged until near to the coast, and then only show their conning-tower above water. Special bow and stern mooring appliances were fitted to them at Dover. One was tried at the bombardment of Westende, but aeroplane spotting by that time had improved considerably, and they were no longer required, otherwise they might have been of considerable value. Another use for which they were tried was to creep for mine-cables while submerged. A special creep was designed to be fired electrically from inside the boat at will, or on a definite strain, nearly up to the breaking point of the creep, coming on the towing-wire. The details of the insulation of the wire after firing and the use of a second creep were interesting, and formed one of the many small experimental works undertaken by us. The use of this was for the Ostend Landing,¹ which

¹ See Chapter VIII.

never came off, so the boats were not actually employed in creeping on service. Soon the tops of their battery-tanks gave out—they were fourteen years old, the first British boats ever built—and it became dangerous to submerge them, so we returned them to their proper port.

One other use for the C. class was to take tidal measurements off the Belgian coast, as described in the chapter on the Great Landing. Lieutenant Wardell Yerburch did most of this work. In vain I tried to get a portable self-recording tide-meter, but such a thing was practically non-existent. The submarine was an ideal meter, as it contained brains instead of mere mechanism. The heights of the tide were taken at every three inches movement of the depth-indicator. The level of the boat fore and aft, the direction of her head, and the degree of heel were all recorded, and the corresponding correction allowed for the difference in height between the foremost and after gauge. The gauges were standardised by fitting the mast of the *Arrogant*, the submarine parent ship, with a pipe connected to the gauge and filled with salt water. The upper end was lowered foot by foot and readings taken on both gauges. In this way actual heads of water of varying heights were used to calibrate the gauges, and, as a matter of fact, they proved to be unexpectedly accurate. I was always sorry not to be able to give the submarines more work, but their very nature was their curse, in that their similarity to the U-boats greatly reduced their practical utility.

In October 1917 I obtained the loan of an E. class boat to try and waylay submarines to the eastward of the Goodwins-Snou barrage. German submarines undoubtedly used the water to the east of the Goodwins. These waters really were those of the old mine-field, laid in 1914, which for three years had been looked on as dangerous, but now the action of the sea and exposure justified us in considering it to be a fairly safe area. This part had hitherto not been hunted by us, and the enemy submarines were therefore probably not keenly on the look-out. Moreover, any enemy submarine there at night

would probably think our boat was one of their own, while, on the other hand, so long as we used one boat only, she knew that everything she saw was an enemy. In this particular case we had the same advantage that the German destroyers always had enjoyed in the Channel raids.

Our submarine left for her patrol at dusk, and was escorted through the barrage, and she returned to the same spot before daylight. On one occasion Lieutenant-Commander P. Phillips in *E. 52* had a shot at a submarine, but, being some distance off, he missed her. I was much afraid that the enemy might have seen the torpedo and given warning to the other U-boats. However, on the night of October 31st—November 1st, she got a good chance and torpedoed *U.C. 63*, which sank at once. One survivor was rescued. Unfortunately this boat was homing, and had reported her position shortly before, so that the enemy were able to locate the approximate position of her loss. After this the Germans were on the *qui vive* in this area, and no more submarines were met with. And so it often was. A new method was tried with one success; and then the enemy countered the attack. But such is war in modern times.

In 1915 the Admiralty instructed me to carry out some experiments on the colours that submarines should be painted in order to avoid detection below water. A good deal of popular misconception exists about visibility below water, the chief fallacy being that if you look down on water from a height you can always see the bottom. Like most fallacies, there is a substratum of truth in this; but you cannot see the bottom of a soup-plate when filled with pea-soup, and however high you go up you will see the bottom no better. The eastern part of the Channel in which we floated was, so far as visibility was concerned, like pea-soup. The banks to the eastward and in the Straits, supplied sand and mud, and the slightest breeze stirred up the shallow water which carried away particles in suspension, making the adjacent waters practically opaque. In the Mediterranean I have seen quite

distinctly in 25 fathoms, that is 150 feet, a boat's rudder that had been lost overboard, but in the eastern part of the Channel 10 feet was the maximum depth in ordinary weather at which objects were visible. The only possible place for the trials was well to the westward, near the *Royal Sovereign* Light-ship, and then only after a spell of fine weather and with feeble tides.

So, when trials were to be carried out as to the visibility of submarines, I put down a few preliminary notes, which may probably be of interest only to the more technical reader. They are given in Appendix V. It was soon found that the waters in the Dover Straits were too muddy for the experiments to yield useful results, and they were abandoned.

Although the foregoing description of the work done by the smaller vessels has been brief, it must not be concluded that their services were unimportant, for important they certainly were and most arduous. Small craft which necessarily suffer from general sea-going disabilities must be looked on as special weapons in the armoury of the Admiral. In fact, the war-vessels of the present day are to the Admiral what clubs are to the golfer, some often used and others on occasions only. Undoubtedly, if clubs were animate instead of inanimate, the more weird and less frequently employed would clamour to be used more often. "We are young and strong, use us and see what we can do," would be their cry. The wise man would smile and encourage them, but would still use the one best suited to his purpose. Again, if dogs could speak many would say: "Give me a free hand to range the fields and see how many birds I can bring back." But he who was meditating shooting over the ground would again smile and encourage his keenness, but would not enter on a course that would keep the fields disturbed, and the birds with their heads up ready to be startled by the slightest noise. These homely similes may perhaps emphasise the fact that war is not won entirely by gallantry, but that the conduct of modern war should be governed by the head.

It is here that patience on the part of all—subordinates, Press, and the people of the country—comes in.

It looks so simple to those who have had the special features of craft like the C.M.B.'s explained to them to visualise the boats out night after night sinking and destroying. But it was not one night in twenty on the Belgian Coast that they could operate with success, and then the targets were few. Moreover, one enemy destroyer sunk, though all to the good, was a poor substitute for the success of larger operations.

As a matter of fact, on one occasion only out of those on which I called on the C.M.B.'s *suddenly* to take a chance opportunity did the weather permit of their operating; on the others the weather prevented them from doing so. They always gallantly tried, but the overpowering forces of Nature intervened.

The smaller the vessels the more is the discomfort and the greater is the exposure entailed by service in all but fine weather. These inherent disadvantages were met with cheery endurance by the crews of the small craft, many of whom were new to sea-life.

All who served in our flotillas of smaller vessels may look back with pride on the years they spent in the Dover Patrol in the service of their country in the Great War.

MOTOR-LAUNCHES

Button tight the oilskin coat, towel round the neck !
We will have the sea to-night washing down the deck ;
It's choppy in the Channel, so it's easy to foretell
That we will have a rotten time in H.M.S. M.L.

Light the burners, start the smoke—quick ! to get a screen.
There will be no shoot to-day if the fleet is seen.
Friend Tirpitz soon will worry round, by searching with its shell,
But will not do much hitting, thanks to H.M.S. M.L.

“ Boats of great utility,” that sounds very fine,
Shallow draught and twelve-knots speed chancing to combine ;
So when an odd job comes along, we all know jolly well
The Admiral will order out an H.M.S. M.L.

COASTAL MOTOR-BOATS

Smallest of our fighting craft, swiftest of the small,
Engines of three hundred horse and forty over all,
Swishing, seething through the sea and dashing through the night,
Three stout hearts and active brains centring on a fight.

See ! an object through the dark ; grip firmly ! hold the breath
While they launch three hundredweight of unexpected death.
Over with the rudder, quick ! In turning watch the blow,
Flash and dull explosion tell them all they care to know.

CHAPTER XVIII

OPERATIONS

The necessity of secrecy in planning operations—Improbable methods of attack should be attempted—Value of shoals—Care in wording signals—Discrimination in deciding what operations should be undertaken—Precautions in cancelling operations—The value of uncertainty on the part of the enemy—Co-operation of Navy and Army on a coast—The peril of the mine-fields—Friendly submarines—Experience and rapidity of decision—Responsibilities of senior officers—Relations between the Admiral and officers in charge of detached operations—The Operation Committee at the Admiralty—Relations between such a body and an Admiral in command—Thinking round an operation—Imagination and experience in a commander.

"If I thought my coat knew my plans, I would take it off and burn it," was a dictum of Frederick the Great. Secrecy is the mainstay of strategy, and surprise that of tactics. It is also obvious that surprise is the result of secrecy. In preparing operations, too much emphasis cannot be laid on secrecy. During 1915 and 1916, and the first half of 1917, the intercourse between the Admiralty and the Admiral at Dover was ideal. No secret was ever put on paper, save when it was either typed or written personally by Sir Henry Oliver, the Chief, and subsequently Deputy Chief, of the Naval Staff, or the Vice-Admiral at Dover. Meetings were frequent. The First Sea Lord and Sir H. Oliver knew everything that the Admiral proposed to do, and the reasons for so doing, and the latter in turn knew their views, and had the advantage of their experience and that of Admiral of the Fleet Sir Arthur Wilson, whose wide knowledge and shrewdness of judgment were of the greatest value. Such relations were ideal. Un-

fortunately reform, or so-called reform, was instituted at the Admiralty, which led to many evils and disturbed the previous procedure.

In preparing operations, several points require attention, and the most important are generally those which local experience has proved to be necessary. Every operation has some one or more essentials which beyond everything else require attention. In the original bombardment of Zeebrugge it was the observation of the bursts of the shell that was vital; and the operations were postponed till some method for so doing had been devised; and the first attempt was abandoned after sailing, since the tripods, necessary for observing and correcting the fire of the guns, began to "work" on board the ships, owing to the sea, and the vessels carrying them could not safely proceed. Without observation of fire, it was useless to bombard. Therefore this became the first essential.

In the second bombardment, observation of fire was still the first essential, but this time our methods had improved immensely and aeroplane spotting was almost perfected. Five times we started, and three times we crossed the North Sea; four times we returned on account of low clouds that prevented spotting. Another point in the meantime had become essential. A lock-gate might be damaged, but not badly so. It was a great advantage to catch the gate shut on a falling tide and let the pressure of water at low tide¹ be applied to it before even temporary repairs could be undertaken. Again, the lock-gates would probably be open at high water, and reasonably safe. After high water one must be shut, and so be more exposed. The best time for firing was therefore just after the tide had begun to fall. The dates when this occurred at daylight were therefore pivotal for the firings.

In the subsequent firings on the coast the enemy had begun

¹ The water on the landward side would remain at its high level, but the fall of the tide would leave the sea-side unsupported and therefore a great breaking strain would be introduced.

to use smoke-screens, the use of which they had learned from us. Everything then depended on getting the ranging shots observed before the smoke-screen obscured the target. Extreme rapidity of ranging became of first-class importance. This argued taking the enemy unawares, and led to our adopting dawn bombardments. As a reply to this, the enemy sent out a sea-plane patrol every day at dawn to warn him of our approach, so as to have time to light up the smoke-screen. This led to the abandonment of the dawn bombardments, and was largely responsible for the reinstitution of the patrol-line in 1917, so that the monitors might always be off the enemy's ports ready to take advantage of a clear spell of weather to bombard. The Germans could not keep a smoke-screen burning continuously, so this defeated them.

In the Great Landing everything depended on surprise and having the right wind, high tide, and hitting off the correct landing positions of the three attacks. These became essentials. Dawn again was desirable, and only certain dates gave sufficient water at dawn. The right wind to take the smoke-screen ashore was an absolute necessity, so also the positioning of the pontoons to within one hundred yards; this latter taxed all our ingenuity, and to obtain this almost any other subsidiary advantage would have been sacrificed.

In the blocking of Zeebrugge the "jump" on to the Mole was vital—every energy was therefore directed, and sacrifice arranged, to make this a swift, sure stroke. Next the finding of the spot on the Mole, and the entrance to Ostend were cardinal features; and all the thought possible was directed to duplicating and multiplying methods of so doing.

Always after I had mapped out an operation, I settled in my own mind what were the essentials, and no minor consideration was allowed ever to intervene to affect the efficiency of their accomplishment.

The next point to consider was what special appliances might be required. I never hesitated to tax mechanism and construction to the uttermost to produce a novelty. I never,

if possible, did the obvious thing or carried out an obvious method.

Always first try the impossible to see how it can be converted into the possible, the guiding principle being that it is better to encounter and overcome difficulties in preparing for an operation than when executing it.

I chose the schemes which promised the most complete surprise, and therefore the greatest chance of success, and went for a solution, however enormous the trouble might appear. While there is leisure and time there usually is a solution to all difficulties.

The tripods to observe the bursts of the shell succeeded because the enemy never dreamed of little artificial islands being erected within 10,000 yards of their batteries. The daily patrol off the Belgian coast succeeded in spite of the apparent lessons to be learnt from the loss of the *Hogue*, *Aboukir*, and *Cressy*, because of the nets laid out. The Great Landing would have had a first-rate chance of success because the enemy would never have dreamed of our landing men in two to three feet of water 100 yards from a sloping wall manned by machine-guns and infantry and under the fire of powerful batteries. It would have required a prophet to have foretold to the officer commanding the defence that behind an impenetrable smoke-screen piers 650 feet long would suddenly arrive opposite apparently the most impregnable part of the coast, and abolish all considerations of depth of water, while tanks would appear suddenly as if amphibians, and, both tanks and infantry, mount a 30° slope of wall with a 3-foot buttress on the top, which should have formed an unscalable barrier.

The net-and-mine barrage was not swept up by the enemy in 1916, when the Patrol was called off it by Admiralty orders immediately after laying. And this was due, I believe, to the light-buoys, which must have puzzled the Germans, and made them suspect a trap. They could not conceive that any one could be such an idiot as to lay out mines and then mark them

with light-buoys. The utter improbability of this deed saved the whole system.

The attack on Zeebrugge Mole was to be from the impregnable outside with the aid of a special brow—not from the obvious inside. The sheer audacity and unexpectedness of choosing the apparently impossible should have made it a thundering success. The attack at Cambrai was a great success, because the expected wire-cutting bombardment never took place, the tanks being used to break through the wire, and therefore the requisite warning was not given to the enemy, who was consequently quite unprepared. These instances are sufficient to show the principle of always doing the apparently impossible, which is fundamental in carefully prepared operations alike afloat and ashore.

When the plans have taken a definite shape, dates must be fixed. Tides, weather, moonlight, daylight—all play their part. Alternative dates when the weather suits must be selected. The provisional date fixes the late limit for rehearsals taking place. Nothing requires more judgment than the decision whether rehearsals are to take place, in that they affect secrecy. So long as plans are locked up in the minds of the Admiral and his one or two chief assistants, secrecy is possible. As soon as parts have to be let out, secrecy is apt to vanish. In building the pontoons for the landing that wretched process of “putting two and two together” by inquisitive busybodies evolved a fairly good idea of their use¹; and, mind you, when a person has guessed a secret he usually feels himself quite at liberty to talk about it, even if it be against the interests of the country, simply because it has not been divulged to him under the bond of secrecy. It is gratifying to some to let others know how clever they have been in guessing a plausible solution.

For the Zeebrugge attack, the building of the false bow on

¹ While endeavouring to keep secret the fact that a landing was contemplated I was told my intention to use large pontoons had been mentioned in one of the London Clubs.

to the monitors would have been sure to attract attention and start a guessing competition. A solution was therefore supplied in advance—namely, that the increase in water-line length of the monitors might improve their speed; and I wrote a camouflage letter to Sir Tennyson d'Eyncourt, the Director of Naval Construction, for office use, suggesting a temporary bow being built for that purpose.

The 80-foot by 10-foot landing-stage for the same operation was to have been built in two halves, each ostensibly for use by the monitors at Dunkirk.

For the Great Landing only the captains of the monitors knew the part of the coast that would be attacked. As a precaution, a memorandum was issued to be read to the ships' companies enjoining secrecy. It contained the statement—"since if the Germans knew a landing was to take place *east of Zeebrugge*, etc., etc., it would be of the greatest value to them," the landing being really to the west of Ostend. Nothing, however minute, should be left undone in order to maintain secrecy of purpose.

Now such parts of a scheme as can be rehearsed by units, may be done early without attracting much attention, for generally a sufficient but incorrect reason can be invented; but a general rehearsal should only be undertaken as near the time of the actual attempt as possible. To what extent a rehearsal is necessary the Admiral alone can judge, but in any case his preparations should, if possible, be such and his orders framed so as to make rehearsals unnecessary.

Before the first Zeebrugge bombardment, when all the ships were newly commissioned and no one knew any one else, when a synchronised operation of dropping the tripods and mooring the ships, fixing their positions both from each other and also from the shore, was contemplated, a rehearsal was necessary, and a full-scale replica was laid out in the Thames with buoys and shapes to represent the salient features ashore, compass-bearings and tide being arranged to be the same as in the real attack. The result was a very rapid opening of fire

and immediate commencement of spotting on the morning of the operation.

For the Great Landing, the monitors were interned up the Thames with their pontoons. I did not dare bring the latter away till the last moment, in case aeroplanes should spot them at Dunkirk. A general rehearsal, with models on a large scale, was arranged for, but the orders were so framed as to make rehearsals almost unnecessary.

When an operation is in course of preparation the Admiral should always have it present in his mind. He should place himself mentally in the position of the leader of each unit, and trace through the operation from that point of view—monitor, destroyer, paddle mine-sweeper, motor-launch, special service boats, etc.—and see that each exactly knows what to do at the right moment, and that he knows when that moment has arrived; whether by bearing, distance run, signal, or what not. With models he has to see that at each point where signals are to be made vision will not be obstructed by the smoke-screen, if used, etc., etc. The questions of what units should do on sighting an enemy patrol, or if they lose touch in error or in thick weather; the probable patrols of the enemy, and what they may do; the line the enemy will adopt in defence or in retaliation,—all points like these for every unit of the Fleet require not only thinking over, but actual digestion and assimilation into a scheme, always with full appreciation of the inky darkness of the night, and the inexperience in fleet working of many of the temporary officers.

In all the firing operations undertaken after the autumn of 1915, aeroplane co-operation for spotting the burst of the shell was a necessity. For a dawn firing the ships, of course, had to start the evening before, but the aeroplanes only started an hour to three-quarters of an hour before the firing commenced. Whether spotting was possible depended on absence of ground-mist, and also cloud below 13,000 feet, otherwise the target was obscured. A height of 13,000 feet was neces-

sary on account of the anti-aircraft guns that the enemy had installed. In addition, a frequent condition was absence of cloud, accompanied by a misty atmosphere hardly noticeable from the ground, but really forming a screen impenetrable to vision from high up in the air. Half an hour before the airmen started it was necessary to know if the conditions were favourable. Words were selected to be made by wireless telegraphy from Dover, which place was in telephonic communication with the aerodrome at Dunkirk, to say "Yes" or "No." As the making of a word followed by an attack might put the enemy on their guard on a future occasion, every morning, at an hour before dawn, a dummy word having no signification except on the real day was made, so that the fact of a word being made, was no guide as to whether an attack would or would not take place.

The same method was adopted in the evening to show whether a projected operation would take place or be abandoned on account of weather. If it were the correct word, then gradually, from all parts of the patrol, vessels would dribble in to the point of assembly. Another safeguard of secrecy was the prohibition of the use of any wireless telegraphy signals after sailing to carry out an operation, except in the case of vital necessity. The human race loves to chatter, and this was apt to extend to wireless signals. If an operation had to be abandoned during the night a destroyer was sent off twenty miles from the Fleet to make the proper word, and her position was chosen so that it gave no indication that the Fleet had been out.

In making reports by telephone or wireless telegraphy, great care should be taken to avoid using a mere negative, such as "not," "unable," "impossible," since missing the word "not," or the dropping of the "un" or "im" reverses the meaning. A phrasing such as "Weather is against spotting," or "Weather is in favour of spotting" is distinctly preferable. No mistake can arise in these by an omission. The following story is an example of the necessity for care in wording signals.

There are two extreme classes of individuals as regards scandal, one who, if scandal is anywhere in the vicinity, is literally scorched by it, and the other who can stand in a veritable gale, and yet the faintest breath never touches him. To this latter class belonged one captain of a ship in the Patrol, and thereby hangs much of the piquancy of the tale. Arriving in Dover one day, this officer received signals from most of his brother captains inquiring about "Annie" and whether she was quite well, etc. He was completely mystified, and probably is so to this day, but the whole Patrol was convulsed with mirth, and all through his want of care in the wording of a signal. He had been on detached service in the Thames with a drifter to work with him. Bad weather threatened, and as he was rather exercised about the safety of the drifter, he made a wireless signal to the Admiral which all the Patrol took in. The signal he should have made was "Threatening to come on to blow; have arranged for the *drifter* to lay close to me for the night." Want of care, however, made him mention merely the name of the drifter, and its name, as bad luck would have it, was the *Girl Annie*!

All operations are timed by Greenwich mean time, and difficulties arise from confusion with British summer-time. The fact that tide-tables and such works are in G.M.T. is probably the cause of this. It would be a convenience in war if British summer-time were continued all the year round, and the same time used in all publications. Once, in repeating a signal to the patrol-line, the important letters B.S.T. were left out, and the Prime Minister sailed from Calais without an escort.¹ He arrived off Dover after dark, and as he was in a packet-boat and unescorted, he was not allowed into Dover, as entry and egress after dark were forbidden except to men-of-war. He spent an uncomfortable half hour, till the identity of his craft was established, when he was allowed in.

¹ It might interest him to know that the inquiry fixed the blame on a boy telegraphist, who got six cuts with a cane. I generally mistrust the blame that falls on the smallest, but in this case it was justified.

The use of shoals was at times valuable when having to navigate in waters that might have been mined. Of course the Germans never mined the shoals—the mines would never have remained there, as the violent action of the sea in bad weather in shoal water causes mines to break adrift—and therefore, when possible, the ships were taken along them when there was sufficient height of tide. In the Great Landing when the state of the water off the enemy's coast, so far as mines were concerned, was unknown (it would, of course, have attracted attention if the water had been explored beforehand), the course of the monitors was set right along the Nieuport bank. Care, however, had to be taken in estimating the depth of water on the shoals away from the land. The tide-curve obtained by a submarine near No. 8 Buoy on the patrol-line (see page 173) showed that the rise there was eight feet instead of fourteen feet as at Zeebrugge and Ostend. A miscalculation was, therefore, easy. Hydrographic information regarding the waters among the shoals was naturally very scanty, and we compiled much useful information by constant tidal observation by the ships on patrol.

It is necessary to make out, in advance, the most comprehensive time-tables for passing buoys or marks so that progress can be checked. To leave anything in the way of calculation to the moment of execution is radically unsound. It is worth days of work beforehand to ensure accuracy even in a small detail, at the moment.

In operations generally, discrimination is required as to which should be undertaken and which not attempted. Chance of success is by no means the only factor. The utility of the operation in furthering the war is one of the chief considerations. Any operation that serves no really useful end should be treated with great suspicion. It cannot be too fully appreciated that the enemy learns much from all attacks especially on a coastline and harbours. Such attacks reveal weak points to him and give his patrols experience, cause him to put on extra patrols, and afford strong arguments to back

up his demands to his government to be supplied with additional vessels or batteries. So that, to a great extent, the more an enemy is worried without adequate reason, the stronger he becomes and the greater the difficulty of subsequently carrying out important schemes against him.

To quote two instances—the attack by our coastal motor-boats by firing torpedoes against the inside of the Mole at Zeebrugge at the spot where the destroyers usually lay, merely resulted in the Germans laying an obstruction to close the harbour to attack from the eastward.¹ The attack was made to give the coastal boat officers and crews a little diversion, and let off some of their accumulated zeal; but it was a mistake. I ought never to have arranged it. Again, the firing on the Tirpitz Battery from the 12-inch gun landed at Adenkerke, although it damaged the emplacements and probably put two guns temporarily out of action, merely resulted in better protection being built to the magazines and the erection of more traverses. It was useful and necessary to arrive at data for subsequent bombardments. But after these had been obtained, no more rounds were fired, the guns being kept ready for the day when an advance along the coast would be made. If, in the preparatory bombardment, the Tirpitz guns were temporarily knocked out, the repairs probably might not be made in time to bring them into action to harass our advance, but firing at other times merely gave the Germans gratuitous information as to their points of weakness.

Our national recreations being largely of a sporting nature, the people of the country applaud, during a war, constant action on the part of admirals and generals. It is difficult for them to grasp that apparent inactivity is often wiser than a multitude of flashy operations, and that winning the war is far more important than the supply of dramatic incidents to be read at the morning breakfast-table. How often was not the remark made in recent years of war, "So and So is a good fellow, *he*

¹ This subsequently hazarded the blocking operation by fouling the propellers of the *Thetis*.

keeps the enemy busy" ? Busy doing what ? In nine cases out of ten the business consisted of the enemy being given the opportunity of learning his own weak points and taking steps to strengthen them. I was warned that the long period of seeming inactivity, while waiting for the day of the Great Landing, was making the country restive ; but I replied that I was not going to endanger the success of an important operation to satisfy the craving of the nation for exciting news.

No more disagreeable or difficult duty exists for an Admiral than having to cancel operations. It requires far more determination to cancel an operation when once the ships have started than to carry it out. But facts are facts, and nothing is more futile than to persist in plans when the conditions are adverse. Several times we steamed with the whole squadron across the North Sea to Zeebrugge and had to turn back when close to our firing position because the atmospheric conditions were against us. The same happened as regards Ostend. Four times we sailed and turned back, and the fifth time brought it off. Patience was necessary to get the best results, but probably the hardest duty I had to perform during the whole period of my command was to turn back the fourth time on each of these occasions. On these nights every precaution had to be taken to prevent the enemy knowing that the attempt had been made, so that by daybreak the ships had to be dispersed in case a vagrant aeroplane might see the fleet together in an unwonted spot and consequently draw deductions and cause the enemy to increase his patrols.

The same applied to air-attacks. When objectives were bombed several times, anti-aircraft guns appeared which made future bombing more difficult. Hence in the earlier times, when machines were few, it was a better policy to wait and collect a fair number of machines, bomb the place heavily and continuously for nights in succession, and then leave it alone for a spell.

Not only did guns crop up, but duplications of important adjuncts were also installed by the enemy. For instance, if a

railway junction were bombed, duplicate signals would be put up so as to give alternatives. In fact, spasmodic bombing frequently resulted in the education of the enemy. The best course was to leave all such places alone, until an advance was in progress, and then, and not till then, bomb them, when the full disadvantage of the damage done would be felt by the enemy, and the advantage caused by dislocation of his traffic would accrue to us.

The value of uncertainty on the part of the enemy is considerable. Surmise may be strong enough to be almost convincing, but cannot be compared with actual knowledge. Prisoners, when examined, may or may not speak the truth; and therefore actual knowledge from photographs or some indisputable evidence is of greater value.

Another form of uncertainty which may assist operations is to create apprehensions which in reality have no foundation. For instance, mines were devised, largely owing to the experimental skill of Admiral of the Fleet Sir A. Wilson, for dropping from aeroplanes into the canals in Belgium during an advance. If one or two barges were sunk by this means it would only have been necessary in future to send an aeroplane to drop stones in the canals or even to fly low over them to cause the enemy to stop traffic and sweep. Thus delays in the passage of ammunition would have been felt.

Inference is, again, another weapon. When the Great Landing was projected, arrangements were made to accumulate trawlers and drifters off Dunkirk in full view of the enemy's scouts. He would have had two lines of argument—either that we were repeating our scare of 1916, and that it was only a blind, or that, if a landing were indeed contemplated, it would be inside a harbour, as the considerable draught of water of these vessels rendered them useless for a coast landing. Napoleon's foresight in shipping saddles in an open and visible manner in the French battle-ships led Nelson to go to Alexandria when he missed the French fleet on their leaving Toulon, whereas in reality it was bound for the West Indies. An

admiral should miss no opportunity of strengthening his plans by such minor deceits, since the cumulative effect of several such whispers will probably lead the enemy to incorrect conclusions.

The information that may be gathered by an experienced interrogator in conversation with an unwary prisoner should not be undervalued. As an example of this, no vessels in the Patrol, except one or two destroyers, ever knew that I was using submarines instead of light-buoys on the Goodwin Snou barrage, since if one small vessel were snapped up by the enemy on a dark night, the Germans might have obtained full information of the scheme, which might have led to our submarines being sunk. A guiding principle should be only to inform those directly concerned of any project that may be under consideration or trial.

It is, of course, obvious never to make a detailed reconnaissance by photography, of the place where an operation is projected, without bestowing similar, if not more, attention on other spots. When photographing the coast to obtain the slope of the beach, this was done and the whole length of the coast covered. This was of value, both in putting the enemy off the scent, as well as those ingenious persons among our own people who put two and two together.

Never neglect any precaution that does not complicate a plan. It is impossible to be too careful when over-care does not matter. Attention to this often saves you from thinking afterwards what a fool you were. But excess of caution should never be allowed to vitiate a plan. In anchoring on a possible or probable mine-field always get sternway on before letting go the anchor, since, if the anchor strikes a mine before reaching the bottom, the bow will have receded from the mine instead of having approached it. This was our universal practice when anchoring for bombarding, since the most convenient spot for firing from was the one most likely to be mined. This is a good example of a small precaution always adopted but never actually required.

We gave up sweeping in front of a fleet at night. The German mine was as dangerous floating as moored; the mines cut adrift could not be seen and sunk, and unless the sweepers were far ahead of the vessels, the warning given by a mine exploding in the sweep would be too late to enable the vessels to avoid the mine-field. It was necessary to make up one's mind beforehand what to do if mines were discovered—whether to go on, go round, or turn back. Taking shoals and other troubles into account, I came to the conclusion that at night it was safer to go on, and so gave up sweeping ahead. Of course the Belgian Coast Patrol-line was always swept ahead of the patrol in the early morning, as they had time and room in which to avoid mine-fields and daylight by which to see the mines.

One important point which was brought home forcibly, was never to mine an area in which, or bordering on which, future operations might take place. On one occasion, in the winter of 1915, when I had reason to believe that submarines were passing close to the north-east end of the Cliffe Island Bank, I mined the area, which proved a considerable nuisance—more bother to me than to the enemy. As it had been laid at night by destroyers, in order that the enemy should not observe the laying, and as this was the first mine-field laid off the coast, and we were not practised in such laying, the limits of its position were doubtful, which accentuated the trouble. Always take the greatest care to fix the position of a mine-field when laying it, since it is probable that it may be desired at some future date to lay more mines near those already placed. The mine-fields shown in the Chart of the Patrol at z are examples of this.

The senior officer of the escort, and also of the mine-layers, sent in separate reports after the conclusion of the laying of a mine-field as to the positions of the mines. In cases where a discrepancy existed, the mine-field was charted to cover both positions. Extreme care and judgment are required in mining areas in successive laying operations. The whole scheme should be got out, and the laying planned with due

regard to the difficulties that the boats will experience in the successive stages in finding their positions and laying in safety. It may appear simple to do this, but it is not, since not a mark must show nor a vessel be seen in the vicinity in daylight.

The Germans were past-masters in the art of laying mines in accurately charted positions, and never laying them in any water in which they themselves were likely to operate. But they carried this too far. They turned a guiding principle into a law, which is always a mistake. They could have worried me much more if they had allowed themselves a little more latitude in these matters.

A certain amount of misconception exists as to the extent to which a sea-force can directly assist with its armament an army operating on the coast. Obviously it should protect the army's flank from sea-attack. It can employ its armament to bombard back areas where reserves may be accumulated, and also disturb communications. In fact, its heavy armament is about as useful as efficient guns mounted on railway mountings ashore. The extent to which it can enfilade trenches depends on the defences that the enemy has installed, and the nature of the coast—in fact on the range at which it can operate. The advantage of enfilading is merely that, since direction of fire is more accurate than length of range, "overs" or "shorts" matter little, and a greater percentage of rounds tell on the enemy. But during an advance such an operation is practically impossible owing to the difficulties of communication both between the front line and headquarters, and headquarters and the ships, unless the exact position of our own troops can be seen. Unless a safe distance to allow for errors in firing exists between them and the objective, it is out of all possibility to allow ships to be used for such a purpose. At times bodies of the enemy may be visible and harassed, but these conditions are sporadic and not to be counted on.

Ships should never attack shore batteries of equal or superior fire, except for special reasons. In bombarding, shoot at the thing you wish to destroy, and never worry about shooting at

the batteries protecting it. The reasons for this are fairly obvious. The vulnerable area of a vessel, say, for example, a 12-inch monitor, is 1,800 square feet. With a shell with a delay percussion fuse descending at 45° and striking anywhere within this area, the monitor should be sunk, since the bottom of the monitor is only ten feet below water, and therefore very near to the upper deck. The only parts of a shore battery that are really vulnerable are the gun and mountings. The turn-tables of a gun-battery are, say, 30 feet in diameter or present each a target of 225 square feet. The gun-positions should be so disposed that each is a safe distance from the next for a reasonable error in shooting. At all events, not more than two positions should form a target to a given round. The vulnerable areas as between monitor and ship are as 1,800 to 450, and, added to this, if a gun-position is hit only one gun, not the whole battery, is placed out of action. The labour of putting out all four positions is at least four times as great as that of putting out a single position. Hence two monitors, each with two guns, would have a four-to-one chance against them in action with a 4-gun battery if other things were equal.

But other factors are not equal. Range-finding from the shore is much easier and more accurate than from the ship. Local aeroplanes for spotting have a shorter distance to fly, and should be available in greater numbers. The guns on land, moreover, can be laid accurately by clinometer. All these factors tell. If the ships remain under way, they are less likely to be hit, but their chance of hitting the battery is diminished. It is a fool's game to wear out guns shooting at batteries unless there is some special definite purpose for so doing. Shooting at the battery will not reduce its rate of fire much, as the crew can take shelter by local signal, arranged by observing the flash of the ships' guns, and the crew can work in the interval,¹

¹ In our case at least fifty-six seconds elapsed between their seeing our flash and the shell arriving. Ninety-four seconds elapsed between seeing the smoke of one of the Tirpitz Battery guns and the arrival of the shell on the Patrol line.

so that it is far better to shoot at the real objective than to waste valuable time shooting at a battery which you know you cannot destroy. The same applies if smoke is used.

Fighting in modern times should largely be controlled by brain. The old bull-at-the-gate methods are those which lose a war, and do not win it. They are magnificent, and make splendid reading ; but they do not pay. There is a tendency to judge of an achievement by the extent of the losses and the gallantry of those engaged in it. This should not be. A difficult operation may, with foresight and forestalling, be carried out with few losses, whereas a more simple one, lightly undertaken, may be expensive in lives and material, and therefore may appear to be a far greater achievement.

Friendly submarines are always liable to be a source of anxiety, as they may be mistaken for enemy boats. In daylight ours were always escorted, as the escort acted as guarantee, but if through fog or other reasons they were unable to turn up at their rendezvous to meet the escort in the morning, they had to submerge for the day. It was of great importance that every destroyer and airman should instantly attack a submarine sighted without the slightest *arrière pensée*, as to recognition signals, etc. Again, as regards patrols, the great advantage the Germans had in a raid was that they knew that everything they saw was an enemy. There never was any question with them as to challenging ; they could fire with guns or torpedoes on everything they met, for they had nothing at sea. With us it was different. In order to observe the entrance of the Channel our units had to be spread out. This necessitated challenging before firing. In the end, as increased numbers of destroyers became available, I was able to concentrate units and assign them definite areas to work in, so that each unit was separated from the next without possibility of meeting. But concentration did away with the observation of the Channel against commerce-raiders breaking through ; but by this time the danger of commerce-raiders had largely passed. Every disposition must be of the nature of

a compromise. The Admiral must decide which interest to guard, which to neglect, and it is here that experience of the locality and also of the temper of the enemy is of the greatest value.

Experience! Everything centres and should gyrate round this essential. Nothing can give it but the sweat of operations, the vigils of nights in the open, surrounded by the units of the fleet. The analysis of little incidents that happened, resolves taken at the moment, regrets for omissions, and all the thousand-and-one things that happen, that just did not happen, and that might have happened—things that lie dormant in the brain until some occasion arises and flashes them out to direct or stay action. The time to say “Yea”; the occasion on which to refuse; the moment to go full speed; the time to stop; when to change a plan with all the concomitant evils of change; when rigidly to adhere to it; the phosphorescence of the water, and the tide-rips suddenly met with,—all have their responding memories in the brain of the Admiral and give him information on which to act.

A reported activity of barges on the canals may necessitate an alteration of plans, and the drawing of vessels defensively to the left flank of the Army. The absence of barbed wire or defensive works at a certain spot cheers him with absolute certainty that his plans have not been suspected by the enemy.

In working destroyers, their wash when steaming at speed, especially in shallow water, should be visualised. Twice I have seen collisions solely due to the wash of the boat ahead when turning. The speed of operations in shallow water at night was therefore regulated accordingly.

Remember, rapidity of decision is often a vital necessity. Make it at once, and console yourself with the thought that if two lines of action require very close examination, generally it matters not which is pursued. To weigh too closely is merely to provoke indecision, and indecision is generally worse than the second best of two lines of action. But train yourself in

ability to decide quickly by constant and prolonged previous thought on the operations.

When making out orders for operations, decide whether they, or part of them, are to be adhered to at all hazards, or which portions may be modified or abandoned by the senior officer as circumstances may arise. Usually the latter obtains, and, when this is the case, preface the orders with a note to the effect that there is nothing in these orders to prevent the senior officer present taking such action as, owing to weather or other conditions, may be requisite for the safety of the vessels under him. This is most necessary, as officers are accustomed to adhere rigidly to orders, although, by so doing, they may risk their vessels; and very frequently the particular operation is quite unimportant compared with the safety of the vessels.

This was brought home to me vividly when on one occasion destroyers were detached to watch the waters close to the Dutch coast, which, as will be seen by reference to the Chart of the Patrol, took them in close proximity to the mine-fields. A very heavy gale sprang up unexpectedly, and I dared not communicate by wireless telegraphy, as it would have betrayed their position. The officer in command, Commander Edwards of the *Botha*, was fairly new to the Patrol, and I did not know if he was already familiar with my views as regards individual discretion as fully as those who had been longer with me. Fortunately he made for the English coast, and got out of a dangerous position; but the orders I had given him would fully have justified his remaining, and I spent a regretful night. After this a paragraph giving discretion to the local senior officer was always embodied in orders.

Two relations are absolutely essential between an admiral and the officers under him—the first, that the senior officer should act as his judgment may dictate in accordance with the spirit of his orders. He is there, present on the spot, and is the only person with full knowledge. The admiral may

think he would have acted differently ; but then, he was not there to judge at the moment. The second is that, however an officer in such a position acts, provided he is not culpably to blame, and however much the admiral may differ from his judgment, it is the business of the latter to support him. He need not employ him as senior officer again on detached duty, if in his opinion he is unfitted ; but by selecting him on that occasion the admiral assumed responsibility for his actions. It is better to foster this confidence than create a feeling among officers that their independent action will not be backed up, and it is important to encourage officers to exercise their judgment. One thing, among many that experience teaches, is that no one brain can foresee the many things that may happen unexpectedly. The great asset on such occasions is the ready exercise of independent action on the part of the senior officer present, and this can best be fostered in officers by complete confidence that their action will be supported.

I have never forgotten a case that happened years ago when Admiral Sir A. Wilson commanded a fleet and had worked out an elaborate search scheme for trial. The ships separated, thousands of tons of coal were burned and much time was expended, when the whole trial failed through one officer misreading his orders. The only comment made by the Admiral to the captains was that it showed the necessity of scrupulous care in studying orders, and "we will try again." Patience is a great virtue. I have in mind two cases which nearly induced me to break the rule laid down, but I am glad I did not.

One thing an admiral should always guard against. He should see that the constant wear of incessant brain exertion does not tend to make him over-anxious, exercising too great a care in provisions against the action of the enemy which may be remote, while the orders issued to avoid these hypothetical occurrences involve undue work on the officers and men under him. There is a happy mean in these matters where risk must be run in order to save increase of daily or nightly work to already hard-worked crews, or when

subsidiary risks are incurred to the matériel under him, which subsidiary risks may be in reality more dangerous than the risk it is intended to avert. I do not wish to convey that an admiral should be the victim of over-introspection and self-examination, but he should be careful to examine fully such matters from the point of view of those who will have to carry out the new orders and balance their labours and the risk to matériel against the probability of the enemy's action, and the damage such action would entail. I will quote one example:

There was an order that no transport was to be alongside the pier at Folkestone on dark nights. This involved considerable extra work on a large number of persons and incidental risk of collision to the transports owing to the crowded state of Dover and the Downs; but the consequences of a successful torpedo-raid by destroyers would have been so far-reaching that the order was necessary. If other vessels had been available to replace these unique ships the risk of having them sunk would not have been worth the increased hours and work to all concerned. This was to me always an interesting case, as the pros and cons were fairly evenly balanced, but the issues on both sides were considerable.

A war is not run for the benefit of the reputation of an admiral or his officers; he should therefore be careful that he does not undertake brilliant operations which have no effect on winning the war, and may even, if successful, be deleterious to more important future actions. Such small undertakings may keep him in the public eye and enhance his popular reputation, but they should be strenuously resisted, although the temptation may be great.

It is of the utmost importance to impress on all officers the necessity for training themselves for instant action by visualising events that may occur. Take, for instance, a destroyer captain when on deck. Supposing, on a dark night, he suddenly asks himself what he would do if he sighted a destroyer three points on his bow. A multitude of doubtful questions immediately arises. Should he challenge? Which way is she

steering ? Challenge not answered—should he alter course to starboard or port ? Should he reverse a propeller ? Should he fire his gun ? If so, foremost or after ? Should he fire a torpedo or should he challenge again, should he try to ram ? And so on. Every sort of question floods on his mind. If he has educated himself by considering many such sudden problems in his leisure time his ideas will have become ordered and arranged, so that instant decisions become a habit. Of course the event that actually happens will probably not be one that he has visualised, but it will be analogous, and therefore his ordered brain will deal with it promptly. All officers in independent positions, or who may be in independent positions, should study this self-education. The dictionary definition of “experience” is incomplete: it is not only “practical acquaintance with any matter gained by trial,” but it is that practical acquaintance digested or ruminated over until its grain is separated from the chaff.

Another point that requires considerable attention in peacetime is to adjust peace ideas to war conditions. Opportunities of carrying out active operations at sea occur but rarely in war, and no trouble, no thought, is too great to expend on what may be the one and only chance of a life-time, and this should be extended when considering matériel. It was extraordinary how difficult it was to inspire certain departments with the real live and vital fact that the war was the one great incident of a life-time—of millions of lives. Committees and others not in contact with the sea were apt to view the war much as they would an important annual manoeuvre instead of the epoch of intense importance when all considerations except those that directly bore on the ardent prosecution of the war should be swept aside. Witness the refusal to appoint Captain Bowering, and then Captain Evans, as Chief of my Staff because of some musty precedent; the fight I had to get my captain in charge of destroyers accommodated in his office ready at night for instant call. What I call the “intense” feeling is rarely felt in an office unless the head is an

enthusiast. I might mention the late Mr. M. M. Waller, Director of Stores at the Admiralty, as a brilliant exception. Committees sitting in offices deal with the paper aspect, not the live aspect of vital matters ; they do not handle actualities, they dabble in abstract propositions.

That an Operations Committee may have uses at the Admiralty there is little doubt, but its uses should be confined to two purposes—one to examine proposed operations in regions not directly under a naval command, and secondly, to provide a section through which special stores can be ordered, and their progress watched without their ultimate destination being divulged. For an Operations Committee to attempt to make detailed plans of any operation for the guidance of a naval commander of an area is absolute folly. It can possess no special local knowledge unless its members are serving in the locality concerned ; their experience is merely that of the ordinary naval officer, which is peace experience—the tactical handling of vessels in peace-time and strategical ideas culled mainly from the extraordinarily able writings of Mahan. No admiral would follow such plans ; they therefore become waste paper. But if the Admiralty purpose some new expedition in a locality where no naval officer is present, then the Operations Committee can pull out charts, compasses, and protractors, and make a skeleton scheme which will indicate the material and personnel probably necessary. Again, however, everything will depend on the flesh and blood that will clothe that skeleton, and they must come from the man who will command.

A department at the Admiralty to carry out the wishes of an admiral, after his schemes are approved, in the way of undertaking the departmental work of ordering material would be valuable, but it should be distinctly understood that it must carry out his views and not its own.

There is one other use of committees, and that is to force an admiral to resign. I will make a few quotations from my diary to illustrate my point. The first is on December 7th,

1917, after I had been in command and in perfect harmony with the Admiralty, under three successive First Lords and three successive First Sea Lords, for two years and eight months.

"If the Admiralty are going to try and run operations in this area there will be no room for me."

December 9th.—"I must have a clear understanding whether I run the Patrol, or an irresponsible committee."

December 15th.—"All day answering the Admiralty letter *re* mine-barrage. It is getting beyond a joke, all my time taken up writing unnecessary letters because they have now half a dozen fifth wheels to the coach. What used to be settled by First Sea Lord and by me now is meddled with by a Barrage Committee and Deputy First Sea Lord. All tommy rot."¹

These show how dangerous it is to have committees away from practical touch with a command, working at headquarters and yet trying to assume executive control. They cannot fail to make the position of the Admiral impossible.

Let me, in conclusion, emphasise the salient points.

War is war, and not a peace manœuvre.

Experience can only be gained by long contact with realities, by the sweat of constant and prolonged thought, by the assimilation of the hundreds of small incidents, by contact with the actual waters, with the peculiarities of the opposing forces, the blackness of the night, and by intimate knowledge of the locality, the performance of each ship, and the individuality of the officers in command.

The value of experience is never appreciated till its absence in others is noticed.

Committees and other excellent and well-meaning persons serving in offices away from an area cannot have and do not appreciate experience. Those who hold

¹ It should be remembered that the Folkestone Barrage was submitted by me and approved in February 1917, but mines were not available till November. The scheme for light-ships and patrols was completed in September, and it was not till the end of November that the First Lord appointed a Barrage Committee, who at once tried to exercise executive functions.

high office have the power to change or override the decision of admirals in command who have experience, but such action should be exercised in war-time with a care that is independent of every thought but the good of the country. They have the power, but they have not the right to exercise it, except under that one condition ; and it is for them eventually to show to the nation that their action has been justified by subsequent events.

Any one can carry out an operation, but the art consists in foreseeing and forestalling difficulties, so that, when the time arrives, its execution is simple and the cost in life and material is as low as possible. When this happens it appears to have been so simple that there was nothing in it, and there practically is no loss of life or loss of material ; but one point overlooked may cause a bad hang-up, and the operation so hampered may appear a far more gallant and glorious affair than if all troubles had been foreseen beforehand. A disaster forestalled receives little credit ; a disaster experienced is often so spectacular that it appeals to our emotions.

Experience is, as I have before remarked, so subtle that it is rarely appreciated even by those who possess it until they see the lack of it in others. Does a mechanic appreciate his experience in using a tool until he sees an apprentice file a square round and a round oval ?

Take the above notes—probably we all appreciate their abstract truth, but are they and a hundred kindred others ingrained in the minds of those who have no longer the benefit of active work, at sea, day and night, and the absolutely constant wrestling with problems which are not abstract propositions, but matters of life and death ?

When the Admiralty wished to relieve me they would have been well advised to have sent my successor to Dover to work under me for three months. I would willingly have welcomed him and put him on the Belgian Coast Patrol-line to learn the work, study the problems, and gain that experience by life and contact with brains inured to the daily work of that

area. Without egotism I am convinced I could have taught him much, not from any superior knowledge of our profession, but from my experience of the Dover area, for, with all his proved gallantry, nothing can supplant experience. However, a new and inexperienced Admiralty decided otherwise, and the failure of the Mole landing to achieve results and the inability to find Ostend brought them the result that any one could have forecasted.

In fact, the preparation of successful operations requires two things—imagination and experience. Without imagination—that is, a flight of thought that enables one to conceive methods more original than the obvious and ordinary—operations become as dead bones and merely a trial of strength against strength with a consequent considerable loss of lives. Imagination may originate methods which, from their element of surprise, may cause metaphorically the walls of Jericho to fall, and great ends to be achieved at small cost. Imagination should be tempered by experience—that is, the cream of past events analysed and sifted by thought. The two should go hand-in-hand and supplement and enrich each other.

My advice to all about to devise operations is—never do the obvious, and never cease thinking of the details. Think, think, think; think round a scheme—thought alone can bring success and eliminate troubles, which without deep thought are certain to occur.

To illustrate the meaning of the term “thinking round,” let us for a quarter of an hour think over the approach of the monitor to the outside of the Mole at Zeebrugge merely from the point of view of the men and their landing, for it is well to confine thought within specific limits, otherwise general rumination leads to confusion and not to concentration. The thoughts may appear sharp and jerky, but it is how they flash into the mind. The night is dark, the picture of the bridge of the monitor at once presents itself, as known on many previous occasions. The vibration of the rails at once leads to the thought of how the 80-foot brow out ahead for

landing the troops may vibrate. To correct this, support it as far out as possible, with struts underneath, and try the effect practically at different speeds and observe where the nodal points of the vibration occur so as to adjust the position of topping-lifts to support the places of maximum vibration. Make a note to discuss this with the constructor. The navigator at the compass—note to be certain to swing the ship to correct the compass with and without the brow in position. The position of splinter mattresses to be considered. Then the men—how disposed on board. The Mole battery may shell the monitor. Not probable if the smoke-screen is efficient, but it may. How will the shell arrive? Nearly horizontal. A steel screen the whole length of the superstructure deck is possible—this could not be armoured to keep out shell; it would be too heavy. It must, therefore, act as bursting screen. Mattresses would therefore be necessary to stop splinters.

Check with Director of Naval Ordnance as to distance of burst of 4-inch shell behind $\frac{1}{4}$ -inch plate, best distance off and thickness of mattresses. If necessary, get Ordnance Committee to try. Note to think over method of supporting the mattresses. Port side would, therefore, be blocked, and men must therefore be only on the starboard side. This will only accommodate half—other half must be on the upper deck below the superstructure deck, protected in the same way, but ship's side will form bursting screen and mattresses will be easier to support against the centre-line casings. How to get on to superstructure deck? The present ladder-ways are all wrong. Rapid ascent the essential. Cut a large hole at least eighteen feet wide, with a continuous ladder the whole width without coamings. Best position lee side of turret armour. Discuss this with the constructor.

Men on superstructure deck go first over the brow. But this is while cable is still running out; build, therefore, a roadway for them over the cable, as flush as possible right up to the brow. The man operating the cable holder will be in the

way. Try to avoid using the capstan engine. Look into this and try practically with men running at night. On the brow rather a crush; therefore side-rails are necessary to prevent any men being pushed off. See about treads being fitted at the most easy angle for a running ascent; same for down descent. Angle of outer leg of brow when in contact with Mole may vary 15° —arrange treads for mean angle. How about end of brow travelling on the Mole? A sideways and longitudinal movement desirable. What is material of Mole, whether stone or concrete? What sized stones, what gaps? Is it cemented flush? Find this out from Belgians who have worked on Mole. Note to discuss the shoes for end of brow with constructor. Will there be much sideways movement of brow? This depends on whether the ship rides end-on to the Mole by her anchor or the friction of the brow. Latter undesirable—argues heavy anchor and short length of chain. This in turn means a very heavy first length of chain to prevent the ring of the anchor being lifted. Note 7-ton anchor and 3-inch first length of chain. How to check the amount of cable that is out—better bowse—to at exact length required, and range this length. Is there any chance of cable being hit by a shell? Think over this with a view to providing protection. The ship is sure to swing a bit, therefore the inboard fixing of brow must allow of motion, also exact angle of inboard end of brow in the vertical plane may vary. This argues a vertical motion also—elementary idea a ball and socket, but vertical movement will be small, therefore a shoe semicircular in a horizontal plane fixed to the deck with a convex slipper on the brow to work on it. This will take thrust and allow a motion in both planes. Talk this over with constructor.

Of course the brow must disengage for shoving off after the operation and the brow be left behind. Easy to arrange, but shores under the brow must be arranged to go also, and topping-lifts must be fitted for slipping. But means will be required to keep the brow pressed home in its shoe, otherwise it

might come out if monitor "sends" back from the Mole. Backstays fitted to brow with slips therefore required, but these must remain taut as slipper moves in its shoe, therefore must be a single wire running round a roller under the brow. Sketch rough details. Visualise the load of men going over brow. Is any particular step required at the head of the two brows? Try this. It may be a wet night—have steps therefore roughed. Is smoke required? What for? Destroyers might fire on strong position at the end or the broad part of the Mole might be manned. Smoke-shell from howitzer on top of the *John Moore's* turret should blind the latter. See about charges small enough to do this.

Machine-guns on special platform on the *John Moore* mast should fire on destroyers. See about control to stop their fire before our men board. Better not use smoke against destroyers except in the form of hand-grenades, as our men will be new to the Mole and be confused and checked in rushing the destroyers; but use grenades. First lot of men therefore carry grenades to bomb the destroyer crews. Should an advance be made along the 4-foot way towards the end of the Mole at the same time? Think over this. Have a full-scale plan of this part of the Mole laid out in a field to practise the men.

And so on, and so on.

After twenty-four hours let us return to the subject again. The first new thought is whether the mast will not require backstays on account of the strain of the topping-lifts. How the brow will be housed inboard previous to the operation, so as not to catch the eye of busybodies. How got into position? It should, if possible, be stowed the port-side between the $\frac{1}{2}$ -inch screen and the splinter mattresses and run forward on rails. This means a swivelling guide on the stem, as the inboard end of the brow will have to come forward the port-side and then traverse over to the centre line to get into the shoe. Look into this. Wire purchase to the 1-ton winches probably best. Sketch details and calculate thrust. This

means that the guys will have to have tackles and not be "standing," as the end will require guying out into position.

Cocoa for men: arrange about heated tank and keys for the petty officers to keep for serving it out, also tins to drink from. Look into "bump" of outer end of the brow in lowering on to jetty—whether counterpoise arms are necessary—if so work chains and weights inboard so as not to increase weight of the brow. Look into best bomb for sinking destroyers. Don't forget the dredger; arrange for airmen to observe her position as near daylight as possible a few days before. But do not trust to this telling where she will be; use it as a guide only. If she is sunk, a passage round bow and stern of blocking ships cannot be dredged until another is obtained, and probably the Germans will be put to the trouble of cutting the plating. If alongside sink with bombs. If anchored off the Mole, arrange to board by two motor-launches. Don't forget that destroyer crews may have taken refuge in lower landing-place of the Mole to escape expected air-raid. Arrange to deal with them.

Have full-scale reproduction of deck of destroyer made to practise men, and to teach them the different hatchways to drop bombs down, and so that they may know the gangways across. Get this from photos and Intelligence Department. Look into smoke-shell from the *John Moore's* 12-inch guns and charges for these in case they are required.

Now, after another lapse of twenty-four hours, a return to the subject brings doubt as to the monitor's mast being able to stand the strain of the bump of ship in striking the Mole, especially if the blow is heavier than was intended. Look into this and have the increased stress on the topping-lifts roughly calculated owing to the absorption of the forward momentum of the brow on stopping the speed of the ship, say four knots in three seconds. Momentum of mast must not be forgotten. If necessary, fit several backstays. This raises question of how to estimate distance from the Mole for reducing speed to four knots and for stopping engines.

Condition on dark night—Mole only lighted up by glare of smoke-boats or air-craft flares. Its outline probably will be very indistinct until it looms up close under the bow. The bridge is rather higher than the Mole, so latter will not show up against the star-lighted sky.

The depression angle taken of the top is too small to be a guide. A depression angle of the base would help greatly. This argues an M.L. with a light at a known height about two feet above the water. Calculate angles for $\frac{1}{4}$, $\frac{1}{2}$, 1 degree, and two cables distant off the bow, depression instrument to be worked from the bridge, but distance calculated from the bow. The ship will be steering to starboard of her line of approach on account of the tide; the lights will therefore be on the port bow and not masked by the fo'c'sle. Note how to get the M.L. in and positioned more or less exactly—how anchored. How she is to detect if she moves on account of tide and perhaps sea. Try this practically outside Mole at Dover. Navigator and special compass will be required for her, as well as a shaded light to show seaward.

As a second alternative, monitor might use Stokes Mortar to burst shell against the Mole wall; the high trajectory and large angle of descent would give a fairly good means of estimating range. The mortar might be rifled with a gradual twist. Think over this and try such a mortar.

Reflection of sound no good on account of other noises. The whole phase requires much more thought. Fit one of the other monitors with a similar collapsing bow and try on Dover Mole to see if three knots is about right. Start in at once and get data for distance run after stopping engines at full speed, and reversing to get six, four, and three knots' speed. Try also helm with engines reversed. Remember, ship will be coming in to starboard of her course—made good on account of the eastgoing tide, and will have to alter to port to strike Mole at right angles. Remember this course for striking the Mole must be a compass course, as it will be impossible to see whether the ship is heading perpendicular to Mole on a dark night.

Arrange for cable to be hung outside starboard bow of ship instead of ranged inboard, to make damage from shell-fire less likely. Cover inboard part with sandbags. Arrange so that two out of each four topping-lifts can be cut without brow falling. If brow is hit by a shell, and collapsed, give up the landing altogether, as unless the men are flooded on to the Mole it will be a disaster. Think over smoke at the end of the brow in case it is required when coming in. Not to be started unless wind is less than the speed of the ship. Draft smoke-boat orders for light wind or if becalmed when approaching Mole. They should make for the lee and take care to douse any smoke that hides the breakwater from the ship. This they can tell by being able to see the ship themselves when lying under the breakwater.

Now apply the same process to considering the relative use of the *Vindictive* and a sloop to bring in the troops for landing, compared with a monitor for the same purpose. Approaching the Mole fire possible but unlikely. Men cannot be kept starboard side of cruiser or sloop—not sufficient room. They will have to be both sides. Hence no protection against shell-fire can be built with sufficient space behind to allow shell to burst. In going alongside there will be nothing to get hold of. If a ship has to be used to press her to broadside on, time will be lost. Brows will have to be carried sloped up to clear top of the wall. This will be a steep angle, and thus a maximum area will be exposed directly to shell-fire if the ship is fired on. Some are bound to be hit, and splinters will be distributed among the troops. The men on top of the wall have to find ladders to get down by. Might carry planks to slide down, but these would have to be 20 feet long and unwieldy, and could not easily be climbed up again. All the rush of the wave of the landing would be lost, and delay would give time for the enemy to prepare to receive the attack. This would be especially bad if the destroyers, with their 4-inch guns and machine-guns, remained alongside. No way of speeding up

except by using a brow to get the men both up and down the Mole wall.

It would only be wearisome to the reader to continue further through successive days, but this is only one fraction of the whole operation. The same method, and the same consecutive days of thought, only carried on for hours, not merely for a quarter of an hour, are required for all portions. Finding the spot on the Mole, getting the ships turned when shoving off after the operation, bombarding the lock-gates, fitting out the blocking ships, the raid on the guns, bombardment of sea-plane shed and west end of the Mole with the 6-inch guns of the monitors, etc., etc., etc. But enough has been written to show how day after day subsidiary details are suggested by constant visualising and thought, and a vast multiplicity of small and big matters have to be experimented on and conclusions reached. All this is absolutely essential if an operation is to come off like clockwork.

EXPERIENCE

Keep thy counsel, so that in thy planning by few may thy secrets be known,
Rumour spreads—formed like circles on water by heedlessly dropping a stone.

Keep thine eye on the matters essential, mistake not the milk for the cream—
Let no points that are minor eclipse them, however seductive they seem.

Discard in thy plannings the obvious, the impossible strive to achieve;
Half the battle is won before starting if plannings the foeman deceive.

If his harbours thy ship-routes o'ershadow, make use both of darkness and light,
Pass your vessels of value in daytime—the raider excelleth at night.

Use mechanics and science to aid thee; strain both to the end for thy good,
For machines may contrive to accomplish far more than mere flesh and mere blood.

If two courses seem evenly balanced, choose quickly and choose either way;
Truly either will bring less disservice than marks indecision's delay.

Having chosen a man for some duty, his actions thou may'st not disown;
If his judgment should fail in performance, the blame like the choice is thine own.

Operations plan not for thine honour, to dazzle the popular eye;
Essentials alone are the purpose for which thou may'st call men to die.

Experience is ever thy stand-by, thine anchor, thy compass, thy log;
Till it's thine, thy achievements resemble the making of land in a fog

Let thy brain never cease meditation; all doings without it are nought,
For in war-time success's main structure, from truck to the keelson, is Thought.

CHAPTER XIX

THE AIR SERVICES OF THE DOVER PATROL

Sea-planes and aeroplanes—Aerodromes at Dunkirk—Development of photographing reconnaissance—Early and late type of machines—Encounter with the enemy—Attack upon Zeppelins—Interception of aeroplanes raiding England—The provision of aerodromes—Persistent attack on the Dunkirk aerodrome—Intercepting German airships—A sea-plane brought down by a submarine—Work of the Royal Naval Air-Service with the Army—Continued attacks on enemy aerodromes—Lighter-than-air machines at Capel and Polegate.

IN 1909 I had charge of the design of the first large British dirigible air-ship, the ill-fated *Mayfly*. I left the Navy in November of that year to take the managing directorship of the Coventry Ordnance Works. Germany was gradually obtaining our trade all over the globe, and driving our shipping more and more off the sea, so that a violent appeal to arms seemed almost outside the limits of probability, especially as there was no field in which her army could usefully be employed against us. However, it was then as impossible to foresee the future as it is now.

A great regret after leaving the Navy in 1909 was the subsequent accident to the air-ship. With unwarranted conceit, I was firmly convinced that, had I remained, I would have brought her through her early trials. She was a first attempt, very imperfect, but a bold beginning. It will always be a bad mark against naval foresight that further attempts in rigid air-ship construction were not continued. I believed in the air-ship solely and simply as a scout in the North Sea. Great Britain occupies a marvellous

strategical position across the mouth of the North Sea ; air-ships in Scotland and Kent could nearly always leave and return to one end or other of the Kingdom with a leading wind, or at all events not a head-wind. The air-ship provides a great platform for reconnaissance work and for wider communication. It is like the battle-ship, in that it can be attacked by smaller and faster craft, and requires, therefore, similar escorts to defend it. Its development will be a problem of great interest.

Now, when the war started, our abandonment of rigid air-ship construction left us without any practical form of air-ship, and with the exception of the S.S. or small airship, we had no air-craft lighter than air during the greater part of the war. Thanks, however, to the energy of Mr. Winston Churchill, we had created aeroplanes, sea-planes, and a Royal Naval Air-Service in spite, it is commonly credited, of considerable opposition on the part of the majority of the Board of Admiralty. Mr. Churchill, with great prevision and insight into the requirements of the future, gave to Captain Murray Sueter and the other officers associated with him consistent support, and to him is due the fact that we were able to carry out, with success operations off the Belgian coast during the war.

The development of the aeroplane and flying generally was the greatest marvel of the war. From being unreliable and of small utility to an Admiral, the nucleus that existed expanded and waxed strong till the end of 1915 saw us equipped with thoroughly useful machines, pilots, and observers, doing work that was absolutely invaluable. After this period construction proceeded by leaps and bounds. In the beginning of 1917 I had to report to the Admiralty that, for certain reasons, we were inferior to the enemy in air-craft on the coast. This was soon remedied, and once more we regained command of the air and held it till the end of the war.

It is this progress that I hope to trace so far as the Dover and Dunkirk air-force is concerned. The process may be crowded with detail, the descriptions of typical contests terse

and given in bald language; but it is a story of great endeavour, and equally great achievement.

In 1914 a base for the Royal Naval Air-service was established at Dunkirk, chiefly with a view to destroying the German Zeppelin sheds within reach of that spot. The military situation was obscure. The front of the two armies was continually altering, and at many places was sparsely held, so that it was difficult to ascertain from day to day the areas that had been invaded by small parties of the enemy. It was, therefore, decided that a force of armed motor-cars, manned by the Royal Marines, should co-operate with the air-craft to harass the enemy and at the same time help the aeroplanes in case of forced landings in dangerous areas—the whole force being put under the command of Wing-Commander Samson, R.N.

A depot was established at Dunkirk, and the three squadrons of the Air Force were located as follows: two at Antwerp and one at Maubeuge. As might have been expected, a great many difficulties were encountered in these early days in the transport and housing of the machines. Fighter patrols and reconnaissance work were added to the bombing programme. By November the enemy had occupied Bruges and Ostend, and was within reach of sea-plane attack. A base for these machines was, consequently, started at Dunkirk. Bombing raids were carried out, and 20-pound bombs dropped on useful objectives.

Early in 1915, R.N.A.S. units were formed for work in connection with the Dover Patrol. These consisted of about a dozen land-machines at St. Pol, Dunkirk, and a similar number at Guston Road Aerodrome at Dover. The sea-plane base at Dover was installed and equipped with four or five machines. The stations for small air-ships at Polegate and Capel were commenced, and the *Riviera*, sea-plane carrier, was attached to the command.

The air force attached to the Dover Patrol was, therefore, soon expanding rapidly in numbers and efficiency. It is well

to remember how vastly inferior early in 1915 the machines and their equipment were to those in use at the end of the war. The difficulties attending the use of air-craft in those days were great. Machines were largely unreliable; they carried no defensive weapon except rifles and shot-guns. Their wireless was inefficient, and no co-ordinated system of spotting for the bombarding ships off the Belgian coast was in existence. In spite of these defects, they did some useful service.

The anti-aircraft defences of the enemy were also growing, and as soon as the advance of the Germans in Belgium had been checked, and the front stabilised on the Nieuport-Ypres line, the enemy commenced rapidly to fortify the coast, and to instal anti-aircraft batteries. "J'y suis, J'y reste" undoubtedly reflected the German determination so far as the Flanders coast was concerned, and no trouble, labour, or expense was spared by them to render the coast impregnable. Aeroplanes and sea-planes speedily appeared in the German area to oppose our growing force at Dunkirk.

The development of the air-craft themselves on either side was also commencing and this continued in all branches of equipment with growing acceleration up to the day when the Armistice was signed. It is safe to say that the rapid progress in design, construction, and equipment of our Air Force constituted a remarkable record in the development of any fighting service. It was early realised by both sides that, with the command of the air, lay final victory in the war; that whichever side allowed itself to be outbidden in that conquest forfeited its powers of probing the dispositions and plans of the other, and relinquished the power of striking at long-range. Moreover, accuracy of fire of modern artillery is almost entirely dependent on aerial observation. In fact, observation during a battle can only be carried out from the air, and the successful use of tanks, artillery, and even infantry, after an attack has been launched, depends greatly on aerial observation.

To gain the local command of the air, fighter patrols

are necessary, for supremacy can only be gained by hard fighting. Every day at that period it became more apparent that fixed anti-aircraft guns, although useful in keeping machines high, could never be of use in stopping bombing. reconnaissance, or spotting, but that machine-to-machine fighting only was the real ultimate rôle of the opposing forces. The strategy of the sea—to seek out and fight the enemy's fleet—held good in the air. It became clear that, unless the air forces of the country were sufficient to do this, and do it with ultimate success, all arms of both the naval and military forces would be hopelessly handicapped as compared with those of the enemy.

Now, early in 1915, the land-machines consisted of Avros, Henri Farmans, and Maurice Farmans, while the sea-planes were F.B.A. boats with 140 H.P. Canton and W. & T.'s with 160 Anzanis. The sea-planes suffered from the defect of not being able to rise from the water in the slightest loup, and moreover their engines were distinctly unreliable under general service conditions.

The original offensive weapon of air-craft was the bomb. The only types available in the early days were the 10- and 20-pound Hales. Then in 1915 came the 65-pound and 100-pound bombs. The bombs themselves were scarce, only limited numbers being available in the early days of the war. So scarce were they, and the demand for them was so keen, that pilots generally took their allowance to bed with them the night preceding a raid, to prevent other keen competitors from stealing them during the dark hours!

The methods of discharge were crude, and sighting appliances practically non-existent.

The offensive weapons against other air-craft were both various and primitive, ranging from automatic pistols to rifles of various calibres, and 12-bore guns firing incendiary bullets, buck-shot, and even chain-shot.

Early in 1916 a marked improvement took place in all equipment. Lewis guns began to arrive in numbers, but their

mountings were crude; and it was not till the supply of the guns provided experience to dictate the most practical and suitable forms of mountings that the aeroplane became armed in a really efficient manner. The gun itself, as first supplied, was by no means a success; the method of shifting the cartridge-tray and the number of cartridges held were unsatisfactory. But worse than anything was the trouble experienced owing to the oil freezing and stopping the functioning of the gun. I remember one case where five of our machines met an enemy patrol over Ostend, and had to return after firing very few rounds, each pilot greeting the other, on landing, with the same remark: "Could you not see that my gun was jammed? Why the dickens did you not chip in?" Eventually a good non-freezing oil was evolved.

Wireless telegraphy, one of the most useful of the adjuncts to aeroplane equipment, was, to begin with, unsatisfactory and unreliable. As can well be imagined, the installation of wireless in an aeroplane was no simple matter; reduction in weight was important, the space was limited, vibration excessive, and the noise outrageous. However, gradually the wireless installations were improved, and the operators also improved, till both became, practically speaking, quite reliable.

Photography in its earlier days was perfectly useless. A general view of nothing in particular was obtained—quite valueless for reconnaissance or recognition work. The anti-aircraft guns of the enemy quite eliminated any advantage gained by improvements that had been introduced in our cameras by forcing the machines up to higher altitudes. As the French and the Belgians were obtaining better results than we were with our machines, I sent for the Head of the photographic section at Dunkirk, gave him a blank cheque on my banking account, and told him to go to London and buy the very best lens that he could find. He returned and reported that he had found one costing £120, which he would test. After a second visit, he had done still better, having un-

earthed in a cellar two 8-inch lenses of about 37-inch focal length. These we bought,¹ and I suggested that they should be mounted by building a fixed camera pointing through the bottom of the chassis of a machine. This was at once taken in hand at Dunkirk. The amusing part of the story was that when the Admiralty official responsible for photographic appliances saw the lenses he remarked, "I had no idea you required anything like that." It is very difficult for Headquarters to keep in touch with the rapidly advancing requirements of war units.

The designing and building of the camera was commenced on June 10th, 1916. There were many difficulties to contend with owing to lack of suitable material and tools, but in three weeks from this date, everything was finished, and an opportunity of testing the apparatus from the air was awaited. The measurements of the camera over all were 45 inches long by $11\frac{1}{4}$ inches \times $9\frac{1}{4}$ inches—no small object to fit in an aeroplane that was intended to carry no more than was already fitted. The camera had to be in such a position that it always pointed vertically at the ground ready to take photographs at any moment that the observer might require. It also had to be entirely out of the observer's way, so as not to interfere with his actions, should he be called upon to attack a hostile machine or defend himself against attack. Its suspension had to be such that all the vibrations of the engine were absorbed. Eventually the camera was suspended in a double gimbal frame, with the lens pointing vertically down through a hole cut in the bottom of the fuselage. This arrangement was made interchangeable with the wireless telegraph gear, so that either could be fitted into the machine for use in a few moments.

The weather from July 4th to the 8th, 1916, was too bad to admit of any test being made, but on the 9th during the bombardment of Tirpitz Battery, Flight-Lieutenant Mack, with Observer Sub-Lieutenant Simms, flew over this objective

¹ Of course the Admiralty eventually paid up.

with the big camera and exposed the first three plates. Although the photographs obtained were excellent in every way, there was a disappointment. Owing to the small area of ground covered by the long-focus lens,¹ as compared with the 8-inch camera previously used, and the fact that there was no lateral control of the camera, the actual guns were just missed, although parts of the battery were shown. These pictures were taken from an altitude of 14,000 feet, but even at this height the machine was hit in five places by anti-aircraft fire; no serious damage, however, was done. These two officers made a further flight over the same target in the afternoon, taking a 20-inch camera that had been obtained from Paris, and they procured two very good photographs of the battery.

Hasty alterations to the suspension of the big camera were carried out, and a method was devised whereby the camera could be controlled independently of the aeroplane, and sighted on any objective within a considerable radius underneath the machine. View-finders of the gunsight type were fitted to enable the observer to take accurate sighting.

Further bombardments of the Tirpitz Battery were carried out during the ensuing days, and on the 19th another trip with the big camera was made by the same two officers, and, although on this occasion there was such a thick mist that no visual observations of the damage could be made throughout the day, a remarkable photograph was obtained from 14,000 feet. This picture showed, to a minute degree, all the damage that had been inflicted upon the battery by our siege-guns' fire. Both the French and the Belgians failed in the attempt to obtain photographs of the battery on this day, and when the R.N.A.S. picture was circulated, something of a sensation was created. On the following day the Photographic Section was crowded out with French and Belgian Staff officers all anxious to see the apparatus and methods that had produced

¹ The longer the focal length, the greater the magnification and the less area of ground shown on the sensitive plate.

such a result, when they themselves had failed to obtain anything at all. Shortly afterwards Lieutenant Mack and Sub-Lieutenant Simms were awarded the Croix de Guerre for obtaining these valuable pictures.

Soon, the advantages of these large-scale photographs taken through a hole cut in the floor of the fuselage, and without the necessity of the observer carrying the camera and leaning over the side, became so obvious that all the small cameras were returned to England and similar large cameras were built at Dunkirk as soon as suitable lenses could be found and purchased. The original cameras were used by No. 2 Squadron R.N.A.S., right up to the signing of the Armistice, and although all the new types of aerial cameras were sent out as they became available, many of them being extremely good, and used with great success, nothing was received that would justify the scrapping of these old long-focus cameras that were built in June 1916.

It is impossible to exaggerate the importance of this improvement in our photography. The enemy's batteries were at once laid bare. Details quite invisible to the observer's eye were disclosed, and the value of reconnaissance correspondingly increased.

Early in March 1915 the Royal Naval Air Service, Dunkirk Command, was taken over by Wing-Commander A. M. Longmore. It comprised No. 1 Squadron, St. Pol, and R.N. Seaplane Base at Dunkirk Docks. This was the nucleus of what, later on, grew to be a very formidable offensive organisation.

As already mentioned, one of the reasons for the location of the air force at Dunkirk was the destruction of the enemy's Zeppelin-sheds and Zeppelins, the latter having become very active, with an increase in the number of attacks on England. Machines were sent up at night from Dunkirk with a view to intercepting any that might return by the coast route. None, however, were encountered until May 17th, when at 3.20 in the morning one was seen ten miles out to sea off La Panne, and nine machines were sent to attack it. Several of these

managed to catch up with the Zeppelin, which was estimated to be travelling at forty miles an hour; but she was able to rise much faster than the planes. Flight-Commander Bigsworth, in an Avro, was the only pilot able to get above her. He dropped four 20-pound bombs in a line along her back while she was over Ostend, and soon afterwards observed heavy black smoke coming out of the air-ship at a point about 100 feet from her tail. Very heavy anti-aircraft fire was encountered, despite his close proximity to the air-ship, so, after releasing the bombs, he proceeded out to sea. Flight Sub-Lieutenant Warneford also reached the Zeppelin, but was about 1,000 feet below it. His observer, A. M. Meddis, fired five shots from a '45 rifle, hitting her between the gondolas without effect. Squadron Commander Spenser Grey got abreast of the airship at 9,800 feet, but could not climb above her, so attacked the rear gondola with his Lewis gun. There were four machine-guns in the gondolas firing at him at the same time. When last seen the air-ship was cruising at about 12,000 feet in the region of Ghent, with her tail well down. A report came in later that she failed to get home, but landed in a damaged condition between Brussels and Ghent.

An attack was made on the Gontrode Zeppelin-sheds at 1 a.m. on the morning of May 25th by Flight-Sub-Lieutenant Warneford. Six bombs were dropped from a height of 3,500 feet. The corner of the shed was hit, but no fire resulted. Exceptionally good work was carried out on the morning of June 7th. Flight-Lieutenants Wilson and Mills attacked the Zeppelin-shed at Evere, north of Brussels. Bombs were dropped right into the shed, which immediately burst into flames. It is not known whether a Zeppelin was inside, but the flames reached a great height.

About the same time Flight-Sub-Lieutenant Warneford encountered a Zeppelin between Ghent and Brussels at a height of 6,000 feet. He dropped six bombs on the air-ship, which exploded and fell to the ground in flames. The force of the explosion turned Sub-Lieutenant Warneford's machine (a

Morane monoplane) upside down, and put it out of control for a time; the pilot had to make a forced landing in enemy territory. He succeeded in restarting the engine, however, and returned safely to his aerodrome at St. Pol. This officer was awarded the V.C. for his exploit, but he was unfortunately killed ten days later while flying a Henri Farman machine at Buch, near Paris.

Again, later in the same year, 1915, on the night of August 9th, there was a Zeppelin raid on England, and scout machines were sent up from Dunkirk at 3.45 a.m. to search for returning air-ships. There was a thick mist along the coast, and a considerable quantity of cloud, with the result that nothing was seen, but at 8.15 the next morning a signal was received that a damaged Zeppelin was in tow going towards Ostend. Flight-Commander Smyth-Pigott, in a B.E. 2C., proceeded towards Ostend to search for it, and discovered the air-ship about three miles off Ostend, being towed towards the harbour with an escort of four destroyers. He dropped two 20-pound bombs on her, and observed that the rear compartment but one was damaged. He circled and approached her again, and dropped six grenades without result, but observed that the Zeppelin's back appeared to be broken. He was subjected to very severe anti-aircraft fire from the shore batteries and machine-gun fire from the escorting destroyers, his machine being hit in two places.

Immediately upon his return Flight-Lieutenant Johnson proceeded to Ostend on a Henri Farman to continue the attack and he unhappily failed to return. Several machines left at intervals during the day to continue the bombardment, and in the evening the rear half of the air-ship was seen to be in the water, and the forward end on the quay; a heavy smoke-screen was put up by the enemy to prevent observation and attack. All our machines were subjected to very heavy anti-aircraft fire, and several were hit.

On August 5th, 1915, Commander C. L. Lambe, R.N.,¹

¹ Now Brigadier-General C. Lambe, C.B.

was appointed to take command of the air forces at Dover and Dunkirk. Throughout the remainder of the war the Dover and Dunkirk air forces owed their efficiency largely to the foresight and sound sense of this able officer. I cannot express too strongly my appreciation of the work done by him. The reorganisation of the Aerial Squadrons was at once put in hand. The two units were amalgamated, and known as No. 1 Wing, R.N.A.S., and it was arranged to maintain four squadrons at Dunkirk as soon as a sufficient number of pilots and machines was available, and to keep two at Dover for patrol and reconnaissance work, these machines being interchangeable with Dunkirk Squadrons requiring a rest. The shortage in the supply of machines was a very serious handicap in those days. British aviation was still in its infancy, and engine failures were common occurrences both on our side of the lines and over enemy territory—the latter meaning, of course, the loss of both aviators and machines, neither of which we could spare.

There were two complete squadrons at St. Pol early in September and two more at Dover, which, it was anticipated, would be ready to proceed to Dunkirk by the end of the month. Wing-Commander Lambe put forward the request that, in order to carry out a vigorous offensive in the spring of 1916—when weather conditions would be more suitable, and more machines available—he might be given permission to put in hand the work of preparing two more aerodromes between Dunkirk and Bergues. This was approved by the Admiralty, and sites were selected at Coudekerque and Petite Synthe. It was intended that the squadrons stationed at these aerodromes should be offensive squadrons composed principally of bombing machines.

On August 23rd we bombarded Zeebrugge with three 12-inch monitors, and five fighting machines patrolled in the vicinity of the ships, to protect them against aerial attacks. Flight-Sub-Lieutenant Mulock attacked a hostile sea-plane off Zeebrugge Mole, and forced it to return to its base. This

was the earliest air offensive off this port that we carried out.

Attacks from the air on submarines were not infrequent, but the results of such encounters were always difficult to assess. In the first place, a submarine, if attacked or about to be attacked, dived. Its disappearance, therefore, might be held to be either due to the bomb or merely to its voluntary submergence. A bomb falling merely near a submarine will do no material damage to the vessel, although the column of water thrown up may surround and eclipse the submarine. Hence accurate observation as to whether the vessel was struck was always difficult. Again, results observed were naturally interpreted by the airman in the most favourable light. For all these reasons I was always chary of claiming a submarine unless wreckage or bodies were visible in the water after the disappearance of the boat.

On November 28th Flight-Sub-Lieutenant Viney, with Lieutenant Comte de Sincey, proceeded in a Henri Farman, armed with two 65-pound bombs, to look for a submarine previously reported off Zeebrugge. When off Middelkerke, about six miles seaward, a submarine was observed proceeding west. This vessel was on the surface, and two men were observed on the conning-tower. Almost directly afterwards, a second submarine was seen about a quarter of a mile away, apparently stationary. While the pilot was spiralling down to attack, the first submarine submerged while the second remained stationary. The latter was attacked from a height of 1,200 feet, both bombs being released together. One of these was seen to strike the craft amidships. The submarine was hidden for a few minutes by smoke from the explosion; but, when this cleared, she was seen to be sinking with her two ends projecting up into the air. The machine circled round for some minutes, until the submarine entirely disappeared beneath the surface of the water, when a large quantity of oil was observed rising.

Squadron Commander Bigsworth also attacked a submarine

six miles off Ostend. Three 65-pound bombs were dropped, and the submarine was reported as destroyed. A further attack on a submarine was made by Flight-Sub-Lieutenant Mulock on September 6th, with five 20-pound bombs. Two appeared to strike the vessel, which disappeared beneath the surface, and was not seen again. The actual loss of the boat was never verified. Patrols were constantly carried out in conjunction with the monitors bombarding the coast, and good work was done by Flight-Commander Haskin and Lieutenant Dalbiac in the development of aerial observation of fire.

The amount of work that No. 1 Wing was called upon to do was now becoming so great that it was apparent that it was impossible to carry on unless more machines and pilots were immediately supplied. At this time there were only three complete squadrons, and many of the officers were called upon to make two long patrols a day. When a series of fine days occurred in sequence this was extremely exhausting work. Moreover, such a procedure was inadvisable, because tired pilots naturally cannot work at maximum efficiency. Two squadrons were, therefore, temporarily detailed from Eastchurch for duty at Dunkirk. This eased the situation very considerably, as they remained at Dunkirk for two months, taking their turn with the No. 1 Wing pilots in patrol and other duties as required. As the winter advanced and the weather became much less suitable for operations, it was found that four squadrons was a sufficient force to carry out all the work that would be required until the spring, so at the end of November one incomplete squadron with twenty mechanics returned to Eastchurch for a rest. On January 19th, 1916, Wing-Commander R. M. Groves took over the command of No. 1 Wing from Wing-Commander A. M. Longmore.

On January 23rd, 1916, at 1 a.m., two German machines, believed to have been sea-planes, flew over Dover and dropped from eight to ten bombs, probably of five kilos weight; it was a lovely clear moonlight night, but the machines could

only just be seen. Soon after noon there was another attack by two sea-planes, which dropped their bombs near the air-ship station at Capel. Some machines were sent up in pursuit, including Short sea-planes. Of course, any attempt at chasing enemy air-craft, except by machines already in the air and actually having the enemy in sight, was absurd. In those days of slow-climbing machines, it is hardly an exaggeration to say that the enemy could be back at his aerodrome before one of our machines could rise from the ground to the altitude at which the attack had been made. The people of England were beginning to have their skin scratched, and they did not like it at all. Their idea of war did not include hostile attacks on this country, and a cry went forth for better defence against air-craft. The reply of the fighting forces was, of course, that the best defence—not an absolute defence, but the best—was attack on the enemy's aerodromes and the maintenance of a strong air force with the Army. What we were busy about was winning the war, not saving towns from being bombed—which was merely an unfortunate accompaniment to war. Moreover, it was impossible to prevent raids by keeping squadrons in England, whereas such squadrons abroad both aided the winning of the war, and, by the destruction of aerodromes, reduced the possibility of raids on England. In time the country saw the necessity of accustoming itself to air-raids, and soon worried little about them.

In November 1915, during a submarine patrol, Flight-Sub-Lieutenant Ferrand, with A. M. Oldfield, in an F.B.A., sighted a hostile destroyer escorted by four sea-planes. Upon the approach of the F.B.A. machine, three of the German sea-planes made off towards Ostend, while the fourth came forward to attack. A. M. Oldfield fired a number of rounds with his machine-gun at a range of about 100 yards, and the German machine, an Albatross sea-plane, was shot down and nose-dived into the water, leaving only her tail visible. This was one of the first hostile air-craft to be destroyed by our patrol in this area, the enemy always displaying a great aversion to conflict.

Except for an occasional bomb-raid, it was quite rare for a hostile machine to come more than a few miles over the lines into our territory, and, when attacked, it always turned back and dived, seeking the protection of the anti-aircraft defences and machine-guns.

Heavy gales and great quantities of rain were experienced during fourteen of the thirty-one days in December 1915, and no flying was possible, while on others the conditions were such that while protective patrols were carried out over the war-ships off La Panne, it was not considered feasible to undertake offensive work.

A merchant vessel was stranded on the sandbank near the Whistle Buoy on the 12th, owing to the stormy weather, and was unable to be towed off. At 10 a.m. a report was received that two German Aviatiks were attacking her with bombs. Machines were sent out, and, from 10.30 a.m. onwards, a continuous patrol was maintained, all hostile machines being driven off. At 3.15 p.m. on the 14th Flight-Sub-Lieutenant B. Graham, with Sub-Lieutenant Ince as observer, in a Nieuport Scout, sighted a German sea-plane, like a Short, but much larger. The Nieuport Scout, which was much the faster, gave chase, and got within 100 yards' range, the position being then practically over the steamer. Flight-Sub-Lieutenant Graham dived and manœuvred his machine so as to enable his passenger to train his gun upwards under the enemy's tail at fifty yards' range. This manœuvre was repeated altogether three times, a number of rounds being fired into the enemy on each occasion. Upon the third occasion, when five rounds had been fired, the hostile machine suddenly turned sharply down, nose-dived vertically into the water, and was observed to be a flaming wreck. The pilot then vol-planed down to investigate more closely; his engine failed to pick up, and he was forced to descend into the sea close to the paddle mine-sweeper *Balmoral*. The Nieuport turned over on striking the water, and Lieutenant Graham had great difficulty in releasing his belt under the water and extricating himself. Eventually

both he and his observer got clear, and within a few minutes the *Balmoral* had lowered a boat and with great promptness rescued the two officers.

Up to the end of 1915 the squadrons at Dunkirk had been using an indifferent aerodrome about a quarter of a mile farther inland than the one used by the French aviators. The former was known as the "Depot" Aerodrome, and the other was known as the "French" Aerodrome. The accommodation at the former for both the personnel and machines was very limited, and also bad, and, as the unit increased in size, and great difficulty was experienced in obtaining huts, things became worse. As many as seventy-five men were crowded into a hut designed to sleep thirty.

The French Aerodrome was a particularly good one—dead flat, and with a good sandy surface; so arrangements were made with the French authorities, who, with their usual good-fellowship, at once agreed for us to use their ground for the night-flying machines and the faster scout types when they began to arrive. The repairs had to be done as best might be. The repair base at Dunkirk was enlarged and organised by Lieutenant Peal, R.N.V.R., and grew rapidly with the requirements of the wings. Gradually the repair lorry and such temporary expedients were replaced by serviceable work-shops. There, however, always existed the danger of serious attack from the neighbouring enemy aerodrome.

The urgent necessity for the most up-to-date machines resulted fortunately in some types being received from the makers before they had had any actual active-service tests—that is, they were used by these squadrons over the lines for the first time, and in consequence early information was obtained of improvements and modifications that would be distinctly advantageous. This was notably so with the Sopwith triplane. Experimental work was carried out at the Depot, and some important alterations were decided upon which were put in hand. Sub-Lieutenant Crouch, who was responsible for many of these, paid a visit

to Messrs. Sopwith and laid his designs before them, almost all of which were accepted and embodied in subsequent machines as they were manufactured.

One of our chief difficulties lay in obtaining spares, as the whole energy of the factories in England was concentrated on turning out completed machines. As a matter of fact, spare parts were quite as important to us as new machines. It often was ridiculous to see eight or nine machines, perfect except in one particular, laid up and out of action. As many of such spares as it was possible to make were made at the Depot.

Although the Depot was growing all this time into such an important unit, the fact could not be lost sight of that its situation was such that it offered a very easy target for hostile operations. Its position near the coast and in close proximity to Dunkirk harbour made it possible for enemy aeroplanes to find it under conditions that would have been hopeless in the case of a target that had not such distinguishing features. Also, it was open to attack from the sea, and its close proximity to the front brought it within the range of the 15-inch gun, several of whose projectiles fell round about the sheds on different occasions. All the other aerodromes, therefore, carried a certain amount of equipment which would enable them to carry out repairs to all but very seriously damaged machines, should it become necessary, and indeed quite a considerable amount of overhaul and repair work was done at these places by the squadrons when time was afforded by bad weather. The enemy had many times dropped considerable numbers of heavy bombs on the Depot, with varying success, but actually very little serious damage was occasioned until the end of September 1917, when a determined and almost successful effort to wipe it out was made. The attacks commenced on the night of September 25th, and continued on the 27th and 29th, and the 1st, 2nd, and 3rd of October. Over 600 bombs were dropped, nearly all of very heavy calibre. The engine-shops and carpenters' shops were completely

burnt out, together with many of the smaller workshops and sheds, and the explosion of one of the bomb-dumps, which was hit at the same time, added to the extent of the disaster. This effectively stopped all further work at this base, except the photographic, which had just previously moved into separate buildings nearer to No. 2 squadron. A new base in a less exposed position was at once equipped.

Very little of importance transpired during the early part of 1916. The weather conditions were unsuitable for flying on a great many days, but patrols against submarines and hostile air-craft were carried out on every possible occasion, and whenever the ships were firing spotting for the men-of-war was effected. Advantage was taken of the lull in activities to get in as much practice as possible in bomb-dropping, wireless telegraphy, etc. Exceptionally good progress was made in wireless telegraphy under the guidance of Lieutenant Nutting. A new type of sending and receiving set was supplied, and this was successfully fitted to various types of machines and thoroughly tested.

Numbers of hostile machines were seen on fine days, but these invariably avoided combat and retired to a low altitude over their own lines. A few fights took place, and several hostile machines were reported to have been shot down; but it was seldom possible to watch them all the way to the ground, owing to mist and clouds.

Sixteen machines were available during January 1916, and a total of 235 hours' flying was put in, covering a distance of 16,450 miles. A special anti-Zeppelin patrol to intercept Zeppelins returning from England was carried out early on the morning of February 1st, and the Wing Commander's report is worth quoting, as an example of the changes and chances of dawn patrols.

"Ten machines—all Nieuports—left at 6.4 a.m. at three minutes' intervals, one and a half hours before sunrise, to take up position at about 10,000 feet, and were lying between

Nieuport and Zeebrugge about 5 a.m. out to sea with a view to intercepting any Zeppelins which attempted to cross that part of the coast at dawn.

"All machines were in position half an hour before dawn.

"The visibility high up was very good, and a Zeppelin could have been seen for a long distance against the dawn.

"Machines patrolled from ten miles seawards to about five miles inland, and were apparently not observed from the ground. This was doubtless due to the thick mist which came up from the east just before sunrise, rising to a height of about 3,000 feet, drifting rapidly down the coast and hiding the land and sea from the pilots. The machines carried only about two and a half hours' petrol, and were all obliged to leave the patrol about 7.15 and 7.45 a.m.

"All were completely lost on coming down to a low altitude, but all managed to strike the coast at various points between Gravelines and Cape Grisnez, with the exception of Flight-Sub-Lieutenant Clayton, who missed Cape Grisnez, ran out of petrol, and was finally picked up in the water about twenty miles N.W. of Dieppe. He succeeded in landing his machine without it capsizing, and the machine floated owing to the empty petrol tank.

"Two pilots, Flight-Lieutenants Mulock and Petre, were able to identify their positions on striking the coast, and found their way back to the aerodrome, aided by large petrol flares, which were lit on the ground and showed up through the haze for a distance of two or three miles.

"Flight-Sub-Lieutenant Penley ran out of petrol and planed down on the water. He fortunately sighted the high-water mark on the way down, and was just able to reach the sands. It was, however, such a near thing that he had to make a cross-wind landing on a soft patch and capsized the machine. He suffered from a slight sprain and a severe shaking.

"During the forenoon Flight-Lieutenant Mulock went out in a two-seater machine with mechanic, tools, etc., and found five machines and pilots, who were down on the sands, gave them the necessary directions, and started them home. In three cases small repairs were carried out."

At this time I gave instructions for the R.N.A.S. to carry

out a night bombing attack on certain shipping that had been reported by reconnaissances two days previously in the Bassin de Leopold, Ostend. It was intended to attack in the first instance with six twin-engined Caudrons and six French Voisins, but, owing to the very high wind prevailing, these were unable to start, and the attack was carried out by five Nicuport machines. The velocity of the wind was 40-50 m.p.h., and there were low, scudding clouds. On the return journey the machines encountered snow and sleet. The moon was in the last quarter and two and a half hours past meridian.

The machines left at 5.15 a.m., each carrying five 20-lb. bombs ; three of them reached their objective and released their bombs, but, owing to the search-lights which were turned on to the machines, it was impossible to observe with what results.

One machine lost its way owing to a failure in its instrument lighting circuit, soon after leaving the ground, and the pilot finally landed at St. Omer, at daybreak. On February 29th Flight-Sub-Lieutenant Simms had a fight with a hostile two-seater machine and shot him down in flames over Dixmude.

At the beginning of March it was decided to make a combined Anglo-French-Belgian bomb attack on Houtave Aerodrome, which at the time was one of the most active of the menacing aerodromes that had been located. Five Caudrons from No. 1 Wing participated, and three Henri Farman from No. 5 Wing. These eight machines carried a total of twenty-five 65-lb. bombs. The French contingent numbered ten heavy bombing machines carrying a total of sixty 90-mm. diameter bombs, and the Belgians sent eleven machines, with a total of twenty-six 155-mm. diameter bombs. Four English, three French, and five Belgian fighting machines accompanied the bombers for protective purposes. Thus the very imposing total, for those days, of forty-one machines participated in the raid. The raid was carried out in the early morning just before daybreak, and very considerable damage

was done to the aerodrome, and one shed was observed to be in flames. On the same morning a sea-plane bomb attack on Zeebrugge Mole was carried out. Sea-planes from Dunkirk, H.M.S. *Vindex*, and H.M.S. *Riviera*, took part. All the machines returned safely, two of those from the *Vindex* being eventually picked up off the water, one near Boulogne and one near Dover.

During a patrol off the Belgian coast in April 1916 a hostile machine was encountered six miles off Zeebrugge. The enemy was engaged for some fifteen minutes, three trays of ammunition being fired. The pilot was observed to fall forward, and the machine dived vertically. The passenger fell out from a height of 3,000 feet, and when the machine struck the water the bombs exploded, leaving nothing but a small black spot visible.

Hostile machines were getting very active in the vicinity of Mariakerke, and, as it was thought that the aerodrome situated there was being used by hostile bombing machines, it was decided to carry out a night-raid and thus get in the first blow. Nineteen of our machines left between 2.30 and 3.40 in the morning on May 5th, and fifty 65-lb. bombs were dropped, a considerable amount of damage being done. Very heavy anti-aircraft fire was encountered, the enemy using a large number of incendiary shells, or rockets, which burst with a vivid green light and were doubtless intended to set fire to the machines. One pilot reported that he flew right through one of these bursts, and, although the magnesium sparks touched the planes, no damage was caused.

Although, in some cases, the warning of the approach to Dunkirk of hostile aircraft was sent through from La Panne, usually the first intimation received was when the machines were actually seen to be approaching, or passing overhead. As they seldom ventured farther west than Dunkirk, it generally happened that these machines were able to get half-way back to their aerodromes before our fighters had attained sufficient altitude to start in pursuit, and when once

over their own lines the hostile machines put their noses down and escaped under cover of the anti-aircraft fire. The French Aviation had established an aerodrome at Furnes, some ten miles nearer the lines, and arrangements were made to send a squadron of our fighters there, so as to have a better chance of intercepting the enemy machines on their return journey. On June 10th a squadron of Nieuport machines was despatched under the command of Squadron-Commander Haskins.

The first Sopwith triplane arrived from England about his time, and its performance in test flights from St. Pol excited the admiration and amazement of all the pilots there. It was found to climb faster and much higher than any machine hitherto seen, to be faster on the level, and to possess wonderful powers of manœuvring and a splendid range of vision. This first machine was sent to the Detached Squadron at Furnes, where it was considered that its powers could be best utilised. Later on, as these machines began to arrive in numbers, some improvements were made in them at the aircraft Depot, until eventually this squadron was completely equipped with these machines and proved itself to be a veritable "thorn in the side" of hostile air-craft.

On July 8th, from 2 p.m. to 9 p.m., one hundred fighter patrols were carried out in conjunction with the one English 12-inch and two French 9·2-inch guns firing on the Tirpitz Battery. These patrols prevented hostile machines from attacking the French and English aeroplanes, which were spotting for the guns; from attacking the kite-balloons, which were also observing; and from coming over the lines to note the position of our guns. Seven engagements with hostile machines occurred, one of which was decisive in our favour. One of our patrols fell into the sea, but both the pilot and observer were picked up. Four British machines successfully carried out spotting for the operations for the 12-inch gun, taking reliefs from 2 p.m. until 8 p.m.

A continuation of the bombardment of the Tirpitz Battery

was made whenever weather conditions were favourable, but before long the enemy started putting up such an effective smoke-screen that spotting observations were difficult. For some time this smoke-screen was always set going directly any of our machines appeared in the vicinity. We, of course, took advantage of this in order to worry them and waste their smoke. During all these attacks the R.N.A.S. aeroplanes carried out a concentrated patrol along the lines, preventing all enemy machines from coming over in the hope of locating the position of our guns. The number of patrols on each of these days was usually over a hundred, and on each occasion one or more enemy machines were destroyed. Between 1.30 p.m. on the 8th and dusk on July 9th no less than 442 hours' flying was carried out by the three wings in this Command.

Always on receiving warning that hostile air-craft were over Dunkirk, the Advanced Squadron at Furnes got several machines away in chase. On one occasion a pilot in a Sopwith triplane sighted a hostile aeroplane making towards Nieuport. Diving from 14,000 to 10,000 feet, and manœuvring behind the enemy, twenty rounds were fired at close range. Unfortunately, while this attack was being carried out, the machine experienced a strong concussion and went out of control, diving steeply for some 2,000 feet. The pilot managed with the greatest difficulty to get his machine again under control, and made a safe landing without further damage. The machine was found to have the whole surface of the upper left-hand plane, and two-thirds of the upper right-hand plane, stripped of the fabric. It was a remarkable performance to have landed the machine safely under such circumstances.

The first raid on St. Denis Westrem Aerodrome was carried out on August 2nd, 1916, when fourteen machines from Nos. 4 and 5 Wings made an attack on that objective, and on Mierelbeke Ammunition Dump, at noon. Two machines were detailed from No. 5 Wing to attack the sheds at Bercham St.

Agathe and Evere, both near Brussels. Both pilots reached the sheds, and, as the one at Bercham St. Agathe was observed to be opened at one end and empty, the attack was confined to the one at Evere. Flight-Sub-Lieutenant Collet glided down from 12,000 feet to within about 250 feet of the top of the shed, releasing his bombs in a diagonal line across it. At least eight direct hits were registered, and huge masses of black smoke commenced pouring out of the shed along its entire length.

One of our patrolling sea-planes failed to return on July 23rd, and was thought to have been shot down by a flight of five hostile machines which were observed flying in formation off Knocke. From later reports received, it appears that the machine had the unique experience of being shot down by a submarine, whilst flying at a low altitude off Zeebrugge. The sea-plane was apparently hit in the radiator, and, being forced to descend on the water, proceeded to taxi with all speed towards Holland. Before reaching neutral waters, however, she was overtaken by a German destroyer, and it is presumed that the pilot and observer were made prisoners.

The work of carrying out long patrols over the sea at a considerable distance from land is theoretically more suited to sea-planes than land-machines, since, in the event of engine or other troubles, the sea-planes can float on the water until picked up, or can, possibly, effect repairs, whereas the land-machine must immediately sink.¹ It was owing to considerations such as these that the work of patrolling the special area occupied by the buoys and net-barrage originally fell principally upon the sea-plane station in Dunkirk harbour. The French sea-plane station, situated in close proximity, assisted in the work. The day was divided into five parts, each of three hours' duration, and arrangements were made with Capitaine de Laborde, commanding officer of the French sea-plane station, that three patrols should be carried out by the British and two by the French sea-planes, each day. This

¹ Cf. page 554.

ensured that every period of the day had its patrol, and that there should be no duplication of work by the two stations.

The air-ship station at Capel, near Dover, was included in the R.N.A.S. Command. The work consisted chiefly of patrols in search of submarines and mines round the English coast, and the escort of troop-ships across to France. It seemed to me that one of the air-ships might be useful at Dunkirk to work on the patrol-line off the Belgian coast in conjunction with the monitors. A shed was erected on the farther side of the Aircraft Depot aerodrome, and in September the small air-ship s.s. *Zero* arrived. Preliminary trials were carried out with the monitor *Sir John Moore*, on September 28th. It was found, however, that the weather conditions and slow speed of the air-ship when released from the monitor in close proximity to the enemy's coast precluded the practical use of the vessel.

A great many raids on enemy aerodromes, dumps, shipping, etc., were carried out about this time, advantage being taken of the suitable weather for both day and night bombing, and the R.N.A.S. Flanders Command was making itself very objectionable to the enemy. To give an account of a tenth part of these raids would be mere wearisome repetition, although they were full of incident and excitement to the pilots and observers, who did admirable work.

On Sunday, August 13th, His Majesty the King and the Prince of Wales paid a visit to the 12-inch naval gun, known as the Dominion Battery. Twelve of the pilots who were operating in the vicinity were presented to His Majesty, who afterwards inspected the gun. Shortly afterwards the royal party drove to the Aircraft Depot and No. 1 Wing, where they were joined by the King and Queen of the Belgians and their children. A tour through all the workshops and hangars was made, and their Majesties, who showed great interest in all that was being done, asked many questions about the work, displaying a very intimate knowledge of aerial affairs. Subsequently the whole party honoured the *Lord Clive* with a visit,

Dominion Battery, where the first 12-inch Mark X gun had been installed, and whose particular work was the destruction of the hostile Tirpitz Battery, had now been located by the enemy, and, as he had dropped a few large shells very close indeed, it became necessary to use a smoke-screen when the gun was firing. Directly our smoke-screen was started the enemy was observed to put up his screen also over Tirpitz. It was also observed that, when our kite-balloon ascended at Coxyde, the hostile kite-balloon at Wilskerke was immediately moved to a position just behind the enemy battery in readiness to spot for him.

The Fleet, whilst carrying out the daylight barrage patrol, reported that it was engaged by the enemy shore batteries with great accuracy and at extreme range, and that spotting was probably being carried out from this kite-balloon, which was moored in the vicinity of Ostend. It was decided to attack it, and Flight-Sub-Lieutenant R. Mackenzie volunteered to carry out the task. At this period there was no suitable bullet which would set fire to a kite-balloon, and it was decided to employ Le Prieur rockets, a French invention which had been successfully used by the R.F.C. The rockets were attached to the interplane struts—four on each side—and fired electrically by means of a switch, by the pilot. The method of attack was to approach from a height, and, when nearly over the balloon, to dive at full speed, firing the rockets so that they would travel only 300 or 400 feet. If fired at a greater range, the curved trajectory of the rocket made it extremely hard to ensure a hit even on such a large target as a kite-balloon.

The difficulties associated with this operation were enhanced by the fact that at this date the German anti-aircraft batteries were extremely numerous and accurate, and, whilst the Fleet was in sight, every enemy gun was manned. Flight-Sub-Lieutenant Mackenzie selected an 80 Le Rhone Nieuport Baby—an extremely strong machine, which could be dived at a speed of 200 miles an hour. He thought out all the

details of the attack, and practised assiduously at a ground target, which was perhaps the most trying part of the operation for the nerves.

The practice consisted in diving from a great height nearly vertically—in reality 70°—to the earth at an enormous speed until a mark on the ground grew in size as it was approached, and exactly filled a circle marked on the wind-screen of the machine. The elevators were then worked, and the machine brought parallel to the ground. A speed of 200 miles an hour means nearly 300-feet travel each second. An error of two seconds would infallibly mean a crash. Moreover, the stress on the planes in straightening up and thereby checking the vertical velocity of the machine by the air pressure under them, was very great. Just fancy the nerve required to see the earth rushing upwards towards the machine and yet holding on till the exact tenth part of a second! In the actual attempt, the danger of colliding with the burning balloon was always present, or of hitting the wire connecting it to the ground, or, again, at so low an altitude, of being brought down by machine-gun fire.

In a short time, he having satisfied himself that he was ready for the attempt, permission was given to carry it out. One beautifully clear and cloudless day, he left the aerodrome, and there were some of his fellow officers who never expected to see him return.

He came in at a height of about 6,000 feet, and dived with his engine full on. For a second or two the machine was out of control, and he lurched forward and accidentally pressed the switch and fired his rockets when some hundreds of feet too far from the balloon. Recovering rapidly, he turned, and came back to the aerodrome. There he altered the mechanism of the switch to ensure that such an accident did not happen again. He started off again, following the same tactics, and this time put the majority, if not all, of his rockets into the kite-balloon at such close range that he actually passed underneath the balloon, just missing the cable, before

he could flatten out. The Fleet and the Advanced Squadron at Furnes had the satisfaction of seeing the balloon come down in flames. He returned, zig-zagging at a few hundred feet altitude until over the lines. For this gallant act he was awarded the D.S.O. I much regret that he was reported missing soon afterwards during the battle of the Somme, to the great grief of the whole squadron, and in fact of all who knew him. Mackenzie was one of the best of organisers, and was always cheerful and bright. He left a lasting monument behind him in the form of a short essay of advice to young pilots.

This attack made the enemy very jumpy for some time, and their crews quitted their balloons in parachutes, or the balloons were rapidly hauled down, if an aeroplane was sighted.

After a suitable interval, however, on October 20th, the Ostend kite-balloon was again brought down in flames by Flight-Sub-Lieutenant E. W. Norton, of the Advanced Squadron at Furnes, in a similar manner, and on the same type of machine. He was for this awarded the D.S.C.

It was of the highest importance to the Dover Patrol that our air force at Dunkirk should maintain a strong air offensive in northern Flanders. This had so far been achieved by Wing-Captain C. L. Lambe, R.N., and the officers under him, but further extension and expansion were necessary if this superiority was to be maintained during 1917.

The ever-growing value of air-craft was daily being emphasised in the official *communiqués*, issued both by the Allies and the enemy, and it was no exaggeration to state that the success of the Allies in the Somme had been largely due to the superiority of the Allied machines in forcing the enemy air-craft to act entirely on the defensive during the three months previous to the attack. The same lesson was learnt in the battle of Verdun, where the French, in the early part of the battle, were deficient in fighting machines and suffered accordingly.

The large number of batteries that the enemy had built along the coast testified to the value they placed on the strip

they held, and it was certain that no effort would be spared to extend this as far as Calais, at the first opportunity. The French had withdrawn all their fighting squadrons for urgent service elsewhere, and the Belgians possessed none, so that the whole of the work in this sector, as well as co-operation with the Fleet, devolved upon the R.N.A.S. Captain Lambe, therefore, put forward memoranda showing the necessity for a considerable increase in both machines and personnel in the following spring. It was proposed that groups of three flights forming a squadron should be organised under a Squadron Commander, and that two or three of these squadrons should form a wing; eight such squadrons were to form the three wings. This was approved by the Admiralty, the process of increase to be gradually worked up during the winter to five fighting squadrons of eighteen machines each, two bombing squadrons and one reconnaissance squadron, together with a total of forty sea-planes of various types. This was to be supplemented by the usual quantity of spare machines, the actual machines in service being 178.

Apart from the vast amount of work the R.N.A.S. was being called upon to do for the Fleet, the protection of England against raids, and for the armies who were holding the twenty-five miles of the line in Flanders, requests for the loan of fighting machines and pilots were made from the R.F.C. operating farther south. In August four Nieuports were lent to assist in the Somme operations, and on October 26th a complete squadron of Sopwith "Pup" fighters under Squadron-Commander G. R. Bromet were lent, with the Admiralty approval, for work with the Army, in response to an urgent request from the military authorities, and the squadron proceeded to Vert Galant Aerodrome, between Amiens and Douvens. This squadron was the forerunner of four such squadrons which were formed at Dunkirk, and which proceeded at intervals to assist the R.F.C.

From the commencement of the battle of the Somme on July 1st, 1917, the R.F.C. had maintained a consistent and

continuous offensive aerial policy over the enemy's lines. This offensive policy, which was maintained right up to the signing of the Armistice, proved most valuable and undoubtedly gave the British the ascendancy in the air. In the late autumn of 1917, however, the R.F.C. had suffered heavy casualties, whilst the full development of training of personnel and the construction of machines at home had by no means been completed. Information was forthcoming that the enemy were making great efforts to expand their aerial forces, and, if possible, to wrest the power of offensive from us. To those officers with inside knowledge it became clear that, with the squadrons available, the balance of power would be in the scales, whereas with additional and unexpected reinforcements, the R.F.C. would be in a position to maintain their existing policy.

It was, I believe, recognised by the leading military authorities that, if once driven to an aerial defensive policy, the chances of successful military operations would be much more expensive in man power. At the period in question the R.N.A.S. was undoubtedly completely master in the air on the Coast Sector, due in part to the Germans concentrating their available resources for the spring offensive farther south; to our superior machines; and to the fact that, owing to such superiority, the casualties were comparatively slight, which enabled the pilots to undergo a longer period of training.

It was obvious, therefore, that the correct policy was to concentrate all our available resources for the great spring offensive which was to take place. The R.N.A.S. pilots entered into the proposal with enthusiasm, and practically every pilot pressed to be allowed to go—so much so that the greatest punishment which could be inflicted for minor breaches of discipline was to erase a pilot's name from the roll of those proceeding to these squadrons on the Somme.

The squadrons eventually sent were: Naval Squadrons Nos. 8, 3, 1, 6, 10, but these were relieved and replaced by other squadrons from time to time.

As this work deals primarily with the operations of the Dover Patrol, no detailed account of the work can be attempted; but it remains to be said that the naval squadrons lent to the R.F.C. earned very high praise for their work right up to the signing of the Armistice, and fully maintained the old traditions of history whenever naval forces have served with the Army on shore.

The following is an extract from a letter from the Field-Marshal-Commanding-in-Chief to the War Office :

‘ The five naval squadrons that have been lent to me for use on the Western Front have been of the greatest value. The pilots have shown energy, gallantry, and initiative, and have proved themselves capable of standing hard work and hard fighting. Further, the machines with which they are provided have undoubtedly helped largely towards the success of the aerial fighting which has taken place this spring on the front of the British Armies in France.

“ I should be glad if this expression of my views could be conveyed to the Admiralty.”

Work at the same time continued on the coast, and evidence accumulated that, so far as the air was concerned, the enemy was getting jumpy, and considered it necessary to bring up more air-craft to this region. On September 8th a night shoot was carried out by a monitor at strong positions at Middelkerke, the spotting being done by an aeroplane. Fair results were obtained, the machine operating from a position between the moon and the target. The estimation of actual distances, owing to the difficulty of seeing good local marks, was not sufficiently reliable for accurate shooting.¹

One of the hostile machines that bombed Dunkirk in daylight on September 24th was shot down in flames by Flight-Lieutenant S. J. Goble over his own aerodrome, at Ghisteltes. Flight-Lieutenant Goble did not leave the ground until after

¹ This failure led to the scheme described on page 95 being devised.

the bombs had been dropped. Flight-Sub-Lieutenant Galbraith also shot down a sea-plane a few days later, which exploded in the air and fell into the sea in pieces. These two pilots were presented with the French Croix de Guerre on October 20th, in recognition of their good work in Flanders. Both had shot down several enemy machines previous to this, and had displayed indomitable courage and resource while carrying out their duties.

After a spell of rough and stormy weather, the conditions improved about the end of October 1916, and aerial activity became very pronounced. Quite a number of hostile machines were shot down, including a sea-plane which had previously dropped bombs on the Nore and had reached Blankenburghe on the way home.

In December 1916 I had a request from Sir Douglas Haig to supply as much assistance as possible to the R.A.F. operating farther south. Of course every endeavour was made to co-operate, and I instructed Captain Lambe to discuss the technical requirements with the representative of General Headquarters in France, General Trenchard, and forward proposals to comply with the army requirements as fully as possible. General Trenchard pointed out that it was of the greatest importance that as many squadrons as possible should be available in the spring, one squadron in the opening days being equal to two or more later on. The squadron which was at present operating with the R.F.C. was doing excellent work, already being credited with sixteen or seventeen German machines destroyed, and some twenty-eight being driven down damaged, with only a loss of three pilots killed or missing, and one temporarily invalided. This was during two months of the winter, when very little flying was possible. General Trenchard wished to retain this squadron and asked for another early in February with an additional one per month up to five squadrons. In order to meet this suggestion, Captain Lambe requested a still larger supply of naval pilots and fighting machines, and the Admiralty promised to make all possible

endeavours to meet our wants. This arrangement was duly carried out, and the following list shows the amount of help that was given by the R.N.A.S. in the Dover Command to the Army authorities during 1917 :

R N.A.S. Squadron.	Date of Departure.	Date of Return.	Months absent with the Army.
1 . .	February 2nd, 1917	November 1st, 1917	8½
3 . .	February 1st, 1917	June 15th, 1917	4½
6 . .	March 20th, 1917	August 28th, 1917	5
8 . .	October 26th, 1916 March 27th, 1917	February 3rd, 1917	3
9 . .	June 15th, 1917	September 29th, 1917	3½
10 . .	May 14th, 1917	November 20th, 1917	6
A . .	November 18th, 1917	—	6

Owing, no doubt, to the fact that the demand for sea-planes was naturally much smaller than for land-machines for war operations, the development of this particular kind of air-craft fell somewhat behind. Moreover, as the reliability of the aeroplanes' engine increased, they flew as well over the water as over the land. The *raison d'être* of the sea-plane was fast disappearing, and it was becoming hopelessly handicapped for fighting a duel with the types of aeroplanes that were now becoming common. It was evident that, unless something was done to alter this state of affairs, we should be losing them in considerable numbers. When first introduced, the Sopwith Sneider Cup sea-plane was a very good machine, both for speed and performance, and compared favourably with any of the hostile machines with which it came into contact. The enemy, however, was improving his aeroplanes as fast as we were, and by the time the Sopwith triplane arrived he possessed several aeroplanes which, while being, generally speaking, inferior in many ways, to the majority of our land machines, certainly had a better performance than our fighter seaplanes.

Thus, towards the end of 1916, the report "Seaplane failed

to return," began to get too frequent, and we naturally commenced to use land-machine fighters for sea-flying in preference to sea-planes.

Later on I wrote a memorandum which explained the relative advantages and disadvantages of the sea-plane and aeroplane when used on an enemy coast. The object of this was to get the Admiralty Air Department to appreciate that what applied to the Devonshire coast, with no enemy within possible striking distance, was inapplicable to the Belgian coast, where the slow sea-plane was up against the fast, quick-climbing aeroplane in a duel. This I tried to point out.

"The sea-plane at present is an inferior aeroplane, considerable advantages being sacrificed by providing it with the power of floating on the water. This flotation is entirely unnecessary, provided the engines are reliable. The engines of aeroplanes, I consider, are sufficiently reliable to make the addition of floats unnecessary.

"Take first into account the inferior reliability of the sea-plane over the aeroplane, and therefore the greater chance of failure over water; then consider the sea-plane crews lost or interned, although their craft were fitted with floats, as well as those lost through the inferior speed and poor fighting capabilities of the sea-plane; against them balance the few lives that have been saved by sea-planes floating after landing on the open sea, and I am convinced that the balance of advantage in safety lies with the aeroplane, and not the sea-plane, when the two are used over water.

"The duties of the sea-plane are :

"(a) Reconnaissance.

"(b) Spotting for ships firing.

"(c) Submarine patrol.

"Taking these *seriatim* :

"Reconnaissance is of two kinds :

"(i) Coastal.

"(ii) Over the North Sea in an area roughly comprised by a line joining North Foreland with the Scheldt.

"As regards (i) it is unsafe to send sea-planes on a coastal

reconnaissance without a fighting escort of aeroplanes, as our sea-planes are powerless against German aeroplanes; the latter merely eat them up in a duel. If aeroplanes can escort, they can carry out the reconnaissance. Why handicap them by sending a slow sea-plane to reduce their speed?

"As regards (ii) if the aeroplanes can, as they frequently do, in fact do almost daily, fly over our patrol-line for a distance of forty miles from Dunkirk to Zeebrugge, and remain flying over this area for an hour, surely they can do the same in any direction of the compass. As the extent of a reconnaissance over this patrol in the North Sea involves no more flying over the sea than is daily done, and can be completed at greater speed with an aeroplane than a sea-plane, why not use the faster and more reliable article? The Germans raid England and fly the whole width of the North Sea with aeroplanes; they never use sea-planes. Why do we use the cumbrous sea-plane to fly half-way over the North Sea?

"Spotting: The same remarks apply. If fighting aeroplanes have to be supplied to protect the sea-planes, why not use aeroplane spotters?

"Submarine Patrol: The remarks as to Reconnaissance apply, but in addition high speed is of the greatest moment. A submarine is, in my opinion, guilty of the greatest negligence if she is bombed by a sea-plane in these waters. The depth of water is ideal to lie on the bottom. The waters are muddy and opaque. A sea-plane should be observed in ample time for a submarine to submerge and move sufficiently under water to be absolutely immune from bomb attack, and the only chance of aircraft success is to have a very fast machine that can spring like a terrier on a rat from a great height, or come quickly out of the sun in the morning or evening. Obviously a fast machine has the greater chance of success.

"I am no believer in any air-craft sinking a submarine except through gross carelessness on the part of the submarine. On the other hand, submarines are not infrequently claimed, but it must be remembered that it is most difficult to observe the effect of a bomb. The splash of the water near, the difficulty of perspective, the rapid dive, probably at a considerable angle owing to haste—all are liable to give a false

impression. And considering that the bomb should be within fifteen feet of the submarine to be effective, and taking the average bomb-dropping accuracy into account, in nearly all cases I believe the submarine merely gets a fright. The fright is valuable in that it keeps the submarine below the surface, retards the voyage, and worries the crew—all of which tell on their occupation.

"So far, then, as regards this Patrol, the development of the sea-plane has, in my opinion, no value. If there are no reliable or reasonably reliable aeroplanes, or these cannot be supplied, then we must continue to use sea-planes as asked for by Captain Lambe. If, however, there are reliable aeroplanes available, I will be glad to have them for keeping submarines down in day-time, and dropping bombs in their vicinity.

"I only speak of these waters and this Patrol. I know nothing of the conditions governing other patrols where sea-planes may be of special value; of these I am entirely ignorant. The views I have expressed merely refer to the waters in my area; but these views I hold to be incontrovertible."

These remarks were at that time looked on as rank heresy and by many with great disfavour.

Eventually in the autumn of 1917 the sea-plane Fighter Squadron was abolished, and the pilots were transferred to St. Pol. The bombing section of the Sea-plane Base was, however, always of service, and was composed of some half-dozen Short machines which, at that time, were about the largest type of air-craft constructed. They had a wing-span of about 70 feet, and were capable of carrying 600-lb. weight of bombs. The ordinary load was nine 65-lb. bombs suspended outside the machine, three held in frames under the fuselage, and three similarly held under each lower plane close up to the fuselage. Upon the arrival of 500-lb. bombs, several Shorts were fitted with a frame to carry one of these.

The first of these large bombs was dropped on the night of November 9th, 1916, when a big combined raid by sea-planes and land-machines was carried out on Ostend and Zeebrugge.

Five sea-planes participated in this, but only three managed to find the objective in the dark, while nineteen land-machines followed up at daybreak. The bombs released were :

1	.	500-lb. bomb.
75	.	22-lb. Le Pecq bombs.
57	.	65-lb. bombs.
36	.	16-lb. bombs.

Of the sea-planes that failed to reach the objective, one was forced to land on the sea off Nieuport, where it drifted for eight hours, during which time the pilot was attacked by a *hostile machine which kept up a galling fire at him*. The machine was repeatedly struck, but the pilot remained uninjured. He was eventually rescued by a French patrol-boat which towed the sea-plane back to Dunkirk. Further raids were made on the same objectives on the 12th, 14th, and 16th. During the first of these a thick fog arose and the machines had the greatest difficulty in finding their way back to the aerodrome. Two of them landed in the sea, but both they and the pilots were saved, one machine being towed into Calais. Another pilot, coming down in order to try to find out where he was, saw a German soldier, who, upon seeing the aeroplane so near, fell off the bicycle he was riding !¹

Twenty-three machines attacked again in the early morning of November 14th, and among other things the gasworks on the Quay north of No. 3 Basin at Ostend were burnt. Upon this occasion the Germans used parachute flares fired from guns near Zeebrugge. The raid made two days later was also on a large scale and twenty-four 100-lb. bombs, twenty-seven 65-lb. bombs, eighty-one 22-lb. bombs, and forty-eight 16-lb. bombs were dropped. All the pilots and machines returned safely, despite the very heavy anti-aircraft fire that was experienced.

Early in December photographs were taken of Bruges Docks.

¹ I remember on another occasion that a bicyclist fell off his machine, being nearly struck by a destroyer running ashore close to him.

The whole of the docks were not included in the photographs, but the part obtained showed the presence of some fourteen or fifteen large destroyers. The enemy put up a smoke-screen when our machine was seen coming over, but examination of the photographs enabled us to discern the ships and to establish their type with certainty in spite of the smoke.

Exceptionally cold weather was experienced during the latter part of January and the whole of February 1917. The water system throughout the camp at Dunkirk froze solid, and remained so for six weeks, causing great difficulties, particularly in the Photographic Section. Trouble also occurred with the water-cooled engines, notably in the case of the Henri Farman machines, which were practically put out of action for the time. It was now also that machine-guns gave so much cause for anxiety owing to the freezing of the oil, while a similar trouble in a lesser degree was experienced with the cameras, due to moisture accumulating and freezing on the gear-wheels of the shutter. Perhaps the most remarkable thing in this latitude was the fact that the sea froze every day on the receding tide until the coast was closed in by a belt of jagged, impassable ice, some hundreds of yards in width!

A further photographic reconnaissance was made to Ostend, Zeebrugge, and Bruges on January 31st, to ascertain what the enemy had done with the destroyers and submarines during this cold snap. The value of aerial photography was again demonstrated, for, while the visual reconnaissance report gave six torpedo-boat destroyers moored in the West Basin at Bruges, the photographs showed fourteen large torpedo-boat destroyers there, with five destroyers and submarines in the East Basin. The harbour was covered with floating blocks of ice, and the south end of the East Basin was practically solid. Ice-breakers could be seen at work. This seemed too good an opportunity to be missed, and, despite the extreme cold—22½° of frost being registered on the ground at the time—an early morning attack was carried out on Bruges Docks on February 2nd. Eleven machines started at various times

during the night, but only six managed to reach the objective ; the other five all suffered from severe engine trouble caused by the intense cold, and were forced to land at various places. Six 112-lb. bombs and twenty-three Le Pecq bombs were dropped among the sheds and destroyers with good results. The attack was repeated the following night, three Short seaplanes dropping eighteen 112-lb. bombs on the two basins containing the destroyers.

Our active operations, however, did not go unregarded, and the German Air Service was evidently instructed to retaliate upon the R.N.A.S. at Dunkirk. This they proceeded to do in a continuous strafe, although on a comparatively small scale. Their method was one compatible with a relative amount of safety, and consisted of sending over at odd times, generally at daybreak, three or four fast scout-type machines, each armed with five 20-lb. bombs with highly sensitive detonators, causing an instantaneous burst at the moment of contact.

A break in the weather called a halt to the continuous bombing attacks on both sides during the first two weeks of February 1917, and, except for an occasional odd day, no flying operations were possible. During such a period, surmise is busy as to what the enemy has been doing in the interval by way of preparations, and, although the rest in itself is welcome, the day is looked forward to when it will be fine enough to admit of investigations being made. Such a day arrived on March 1st, and both the enemy and ourselves took advantage of it. Two photographic reconnaissances were sent out from St. Pol, each with a large number of plates. The first consisted of Flight-Sub-Lieutenant Keeble (pilot), and Sub-Lieutenant Betts (observer), and they were instructed to take photographs of the coast and all important points between Wenduyme and Ostend. When over Breedens, and after exposing half the plates, this machine was attacked by a Halberstadt, with two synchronised guns, at close range. At least seventy rounds were fired, and one longeron was severed ; the oil-pump and

revolution-counter were also smashed. Sub-Lieutenant Betts fired his gun at the Halberstadt, at a range of from 20 to 60 feet, emptying a tray of ammunition, of which three-quarters was seen to enter the engine and fuselage.

The hostile machine broke off the engagement and headed for Ghistelles, where he could not be chased because Flight-Sub-Lieutenant Keeble's engine was running very badly, and was likely to stop at any moment; this happened, as a matter of fact, almost directly afterwards, but the pilot glided his machine over the remaining objectives, while the observer continued to take the photographs, until all the plates were exposed. The machine had dropped to 10,000 feet before a turn was made for home, and this was reduced to 6,000 feet before the lines were crossed. As it was found impossible to reach St. Pol, a landing was made at the Advanced Aerodrome at Furnes.

The second photographic reconnaissance (Flight-Lieutenant Edwards as pilot and Sub-Lieutenant Chase as observer), was based on instructions to photograph Bruges, Zeebrugge, and the coast up to the Dutch frontier. Whilst exposing plates over Bruges, five hostile machines were observed cruising to the east of the town. As the Sopwith machine was not doing very well, and would not climb above 12,000 feet, the pilot decided to return home. The hostile machines, which were immediately above ours, attacked, one taking up a point above the tail, three gliding towards the machine on the port side, firing as they came, whilst the fifth made a direct frontal attack. The machines in front and behind our machine dived simultaneously, firing over a hundred rounds. Sub-Lieutenant Chase held his fire until the machine diving on the tail was within a few yards, and then fired a complete tray into the pilot's face and machine, whereupon the hostile machine stalled, side-slipped, and finally went down in a spinning nose-dive, with smoke issuing from it. Almost simultaneously Flight-Lieutenant Edwards fired a tray at the machine attacking in front, which to all appearances side-slipped and went

down out of control. Lieutenant Edwards then dived his machine, attaining a speed of 100 knots, and headed for Furnes Aerodrome. Although he was shot through the shoulder and both feet, he succeeded in making a perfect landing. Both Lieutenant Edwards and Sub-Lieutenant Chase were awarded the D.S.C. and French Croix de Guerre for this exploit. Lieutenant Keeble and Sub-Lieutenant Betts had already gained these distinctions. Lieutenant Edwards, who was transferred to La Panne hospital, was visited by the King of the Belgians, who conferred upon him the Insignia of the Chevalier of the Ordre de Leopold.

During an attack upon Zeebrugge Mole on the night of April 4th one pilot, when releasing his bombs, accidentally knocked the switch of the ignition. He opened up the throttle to no effect, and was obliged to land on the water just off the end of the Mole. It was about eight minutes before he found out the trouble, and by this time a large tug was coming up with a search-light trained on the machine. The pilot just started his engines in time, and managed to get off the water as the boat was within hailing distance. A lucky escape !

A further raid was carried out on the following night, when four 520-lb. bombs and thirty-one 65-lb. bombs were dropped. It was observed that, as soon as the attack started, all the destroyers (about ten in number) left the shelter of the Mole and steamed rapidly out to sea.¹ It was upon this occasion that one of our Short bombers was attacked by a hostile seaplane of the small two-seated fighter type. This was the first occasion upon which our machines had been attacked at night. The hostile machine dived down from above, and, after firing a few shots, disappeared below and was not seen again.

Such are a few out of the many exciting experiences of our machines about this date.

The Short bombing machines, which had been the best

¹ This information was useful ; cf. page 468.

weight-carrying machines available, were now being ousted by the arrival of the Handley Page land-machines. Arrangements had been made at Coudekerque early in February 1917 for the accommodation and subsequent operation of some of these machines. The first to arrive was brought over by Squadron-Commander Spenser Grey at the end of March, and its appearance created great excitement. This giant machine was fitted with two 250 H.P. Rolls-Royce engines, and had a wing-span of over 100 feet. The engines were carried in separate nacelles, supported between the wings, one on either side of the fuselage. The forward end of the fuselage projected well out in front of the propellers, giving the gun-layer a commanding and uninterrupted scope for observation and the use of his gun.

The advantages of the Handley Page machine over the Short were many, and moreover its future development was foreseen to be more promising. I at once asked for a supply of these machines to be sent over at the first possible moment to replace the Shorts and Caudrons. The principal advantage lay in their great weight-lifting power, the normal load of bombs being twelve 112-lb. bombs together with the pilot and two gun-layers, against the Short's eight 65-lb. bombs, pilot, and one gun-layer. There was also an advantage in speed of some ten to fifteen miles per hour, but their climbing and manœuvring powers were not quite so good.

By the end of April five Handley Pages were delivered at Coudekerque, and Squadron-Commander Allsop was placed in charge of them as a separate squadron. They were used at this time for daylight submarine patrol work along the coast, as far as Zeebrugge, and one of their first successes was when, early in May, a formation of four Handley Pages caught five hostile destroyers at sea, and succeeded in sinking one and damaging others by bombs. Shortly after this, however, came the first loss of this class of machine. One pilot, venturing too far away from our fighter patrol, was attacked by a single-seater sea-plane off Ostend. The hostile machine got near the

tail of the Handley Page and shot through the petrol tanks of both engines and wounded the observer. The pilot made towards Nieuport, but was forced to come down on the water about two miles from the shore. The hostile coastal batteries immediately opened fire, attempting to destroy the machine. Two French three-seated flying boats made very gallant attempts at rescue, the first one landing alongside the crippled machine in a perfect hail of shrapnel from bursting shells. He picked up the wounded observer and got away with him in spite of a huge hole in his top plane which was caused by a shell-burst. The second flying boat was less fortunate. Having taken two more of the Handley Page crew aboard, she had barely risen from the water when she was hit in the engine by a piece of shell, and was forced to land on the water. Hostile motor-boats were by this time approaching from Ostend, and the whole party were taken prisoners. Soon after this it was decided to restrict the operations of these machines to night bombing, a work for which they were eminently suited, as, owing to the large wing-span, they were very steady on coming to earth, and could be landed in the dark at quite a low speed.

As it was inadvisable to mix machines of this type with the small Nieuports and Sopwiths, these latter were sent to Petite Synthe aerodrome, which left Coudekerque entirely as a heavy bombing machine aerodrome for night operations. Petite Synthe was taken over by No. 5 Wing and the whole of No. 4 Wing was transferred to an area nearer the fighting line. Squadron-Commander Babington took charge of the Handley Page machines, and he spared no pains to get them up to the maximum efficiency. He was a good organiser, and arranged, in conjunction with Lieutenant Tyrer, R.N.V.R., a first-class system of control, whereby night after night, often in the pitch dark, every available machine was got away fully loaded with bombs, to return later and land on the same aerodrome, without a hitch. Upon many occasions some of the machines made two trips in one night, and it speaks well

for the skill of these two officers and the pilots engaged that accidents of any form rarely took place.

A new type of reconnaissance machine, called the D.H. 4, also appeared about this time. The first machine was brought over to Dunkirk by Commander Groves, R.N., and it was just the type of machine required for the reconnaissance, photographic, and wireless work along the coast. A number of these machines were asked for to equip No. 2 Squadron at St. Pol, and as they arrived they were rapidly adapted at the Depot to take both the photographic and wireless apparatus. The first arrivals were fitted with Rolls-Royce 250 h.p. engines, but, owing to the difficulty of turning out sufficient of these engines, a certain number of the later machines were fitted with 200 h.p. engines, which were scarcely of sufficient power to please the pilots. The speed and performance of the machines so fitted was considerably better than that of the Sopwiths, but it was very disappointing to the pilots to feel that the own brother to the machine they were flying was so very much better. The larger Handley Page type, which were also reaching the command, were beautiful machines. They were supplied with 275 h.p. Rolls-Royce engines, which gave wonderful results.

One of the main faults of the 1½ Strutter was the fact that the peculiar cowling round the engine caused a very pronounced humming which could be heard from a great distance. This meant that all the anti-aircraft batteries were on the alert, and the machine was picked up even before it got within range. The highest altitude that could be attained by these machines when carrying the photographic or wireless gear was somewhere about 15,000 feet, whereas the D.H. 4 was very silent and could climb to well over 20,000 feet under the same conditions. At this great altitude the machines were remarkably sensitive on the controls, and could be manœuvred and flown in a manner that made the Camels and triplanes seem out of date, and there was no machine built that could catch one of them at this height if she wished to get away. As

suitable photographic apparatus had already been built at Dunkirk, photographs of all enemy work were now taken with the D.H. 4 at altitudes varying from 18,000 to 22,000 feet, approximately three to four land miles. Jacobenessen, another coastal defence battery of very large dimensions, was discovered by photographs. Its position was relatively the same as that of Tirpitz, except that it was on the east side of Ostend instead of the west.

With the arrival of more large bombers in April, it became possible to drop a heavier weight of bombs in a single raid, than had hitherto been the case. On the night of the 7th a number of these machines attacked the sea-plane base at Zeebrugge with two 550-lb. bombs, one 264-lb. bomb, one 100-lb. bomb, and twenty-nine 65-lb. bombs. The pilots came down very low and were greeted with a great display of red and green coloured fire-balls projected into the air. There was no anti-aircraft fire at all after the first pilot had released his bombs, although the machine-gun fire was very intense. A few weeks later on, one of our bombing machines was hit behind the pilot's seat by one of these fire-balls, which burst and flowed off the fuselage like a burning red liquid. No damage was done to the machine.

Early in May 1917, when the Handley Page Squadron was well established, the total weight of bombs dropped in one night increased vastly. Three separate raids were carried out on the night of the 9th, and over 9,000 lbs. of bombs were released on Bruges, Zeebrugge, and Ostend.

During the evening of June 4th a report was received that hostile air-craft were over England, and patrols were sent up to intercept them on their return. Sixteen machines were encountered in the vicinity of Ostend, and these were immediately attacked. Two were destroyed and four were driven down out of control, two of which were almost certainly crashed.

On one occasion continuous escorts were carried out from 11 a.m. to 5.30 p.m. for the protection of machines spotting

for the Belgian batteries. These patrols encountered quite a number of hostile air-craft. One pilot attacked five single-seaters and succeeded in destroying one and sending a second down completely out of control, while another of our pilots encountered six enemy machines, of which he shot down two out of control. Many other engagements occurred which resulted in several more machines being driven down.

On June 15th Flight-Lieutenant Fowler and Observer-Lieutenant Gow made a photographic reconnaissance to Antwerp in one of the new 375 h.p. Rolls-Royce D.H. 4 machines. This trip was made without escort, the two officers concerned preferring to take the chance of the single machine being unobserved at 20,000 feet, rather than call attention to their presence by a formation of several machines at a lower altitude. Their decision proved to be a good one, as they made the whole journey both ways without molestation. The visibility was very bad, and prevented visual observation; but a large number of valuable photographs were obtained, practically the whole of the extensive docks at Antwerp and Hoboken being included.

For some time past it had been known that a big gun emplacement was under construction near the village of Leugenboom. From the position of the concrete, it was expected that this gun was intended to fire on Dunkirk. About the middle of June a kite-balloon was sighted undergoing what appeared to be trial ascents just behind the gun position, and at 5 a.m. on June 27th, 1917, large shells commenced to fall in the docks, aerodromes, and various parts of the town of Dunkirk. The whole sky was overcast with rather low cloud, and it was thought that spotting was being carried out with kite-balloons, one of which was clearly visible in the air off Ostend. The firing continued up to midday, fifty-five shells of 15-inch diameter falling in the vicinity. Considering the range of twenty-four miles, the shooting in the early stages was good, the casino and an ammunition-train standing by the sea-plane sheds receiving direct hits.

We therefore attacked the enemy kite-balloons by aircraft, six of these being forced to descend during the early morning, after which the shooting became very wild, most of the shells falling some hundreds of yards short of the town. As a counter-measure the Dominion Battery¹ opened fire on Ostend just before noon, and almost immediately afterwards the Germans ceased fire.

On July 4th machines were sent to intercept a large formation of machines that had raided England by daylight. One flight of five machines met a formation of sixteen twin-engined Gotha machines off Nieuport, and immediately attacked. Two of the enemy were shot down in flames, while one was forced to land just south-east of Ostend and another was last seen flying low over Holland.

In connection with this, I must mention one of the finest fighting pilots of the R.N.A.S.—Lieutenant Dallas. He was attached to the squadron at Furnes, and the skill and courage with which he carried out his attacks served as a wonderful example and incentive to all the pilots with whom he came in contact; later on he was posted to a naval squadron, lent to the Army, and exhibited his fighting qualities in the same vigorous manner. Amongst his brother officers he was always extremely popular, his quiet and unassuming nature being a direct contrast to his fighting tactics. He won many decorations, including the D.S.O. and bar, and accounted for between forty and fifty hostile machines actually destroyed, with as many again unconfirmed. He was unfortunately killed while doing wonderful work with the Royal Air Force.

Raids on England still continued, but the wisdom of offence abroad rather than defence in England was gradually becoming apparent. Our continued bombing of enemy aerodromes was producing good results. Great damage was being caused, and consequent disorganisation created. It was also evident that the enemy was being forced to use a considerable portion of his bombing machines to attack the aerodromes which were

¹ This was the naval 12-inch gun landed and mounted at Adenkerke.

originating the attacks on them and causing them all the annoyance. The net result was that a great part of the enemy's bombing power which might have been used against England was used against our aerodromes abroad.

The necessity for command of the air during military operations was becoming daily clearer, so that the more efficiently we maintained and increased our air-force on the fighting front, the greater the inducement to the Germans to devote their air-craft building capacity to supply fighting machines for the Army, and seriously to consider whether their constructional energies were, or were not, being wasted in building machines to drop bombs promiscuously in England. Without doubt, so long as a surplus of air-craft supply existed, eccentricities such as attacks on London could be permitted by the military authorities; but when the pinch of supply came, then war necessities were certain to stifle the clamourings of the crank in support of useless but showy operations. Raids on England, therefore, about this time were largely on the wane.

Besides bombing the areas requested by the Army authorities, it was still possible to utilise a portion of the force to meet the requirements of the Navy as well as to attack aerodromes.¹ On one night alone, early in June, over five tons of bombs were dropped on Bruges Docks. On July 11th this was exceeded, and over six and a half tons were dropped. Numbers of other raids were carried out, when considerable quantities of bombs were released. July marked the discontinuance of the use of the Short machines and the completion of No. 7 squadron with Handley Pages. Apart from the greater efficiency of these latter machines, this arrangement allowed the number of spare parts to be reduced, and all mechanics to be trained to work with one type of machine only. The Short sea-planes were retained a little while longer, but before long were sent back to England.

In August a large American flying-boat arrived and carried on the submarine patrols. This machine operated from the

¹ I always gave the Army, during an advance, the prior call on our machines

sea-plane base, but was too big to go into the sheds, and had to be anchored in the docks. It was escorted during these patrols by pilots from the original sea-plane squadron, who had previously been transferred to No. 1 Wing to fly scout land-machines. The boat body of this machine made it quite capable of resting on the water in an open sea; it was about ten knots faster, but otherwise it was no great improvement on the Short sea-planes.

The particularly good weather experienced during July 1917 rendered that month the busiest period in the whole of the R.N.A.S. operations in Flanders. A greatly increased number of hostile machines appeared in the area, probably owing to the arrival of the 10th Corps on the coast, and the increased artillery activity that at once took place. On one day alone, July 7th, no less than seven hostile machines were destroyed without loss on our side.

The Davis gun was introduced at Dunkirk about this time and one was fitted to a Handley Page machine to study the results. The gun fired simultaneously at both ends, so that the recoil which would normally result from the ejection of the 6-lb. shell was counteracted by simultaneously discharging a quantity of buckshot at the rear end of the barrel. This necessitated the gun being very long. Fire was limited practically to a directly downward direction, as care had to be taken not to eject the buckshot into any parts of the machine. One of the guns, as I have said, was fitted to a Handley Page, and for a short time was used during bombing raids in lieu of bombs, when shells were fired at ammunition dumps, transport parks, etc., by way of variety. It was, however, soon abandoned, as it was considered that the equivalent weight of bombs produced more satisfactory results.

It was at this time that I called on the R.N.A.S. to carry out the special photographic work for the survey of the Belgian coast in connection with the Great Landing which was projected. It was undertaken by No. A squadron. It was necessary to take a series of photographs of special sections

of the foreshore from about a constant altitude on the same day, and at given times during the rise and fall of the tides. This was a very arduous task, as it necessitated the flight of the photographic machines over the same spot at regular intervals throughout a considerable part of each day, and gave much valuable practice to the enemy's anti-aircraft guns. This task was carried out on many occasions, with satisfactory results, and, I am glad to say, without the loss of a single machine.

During one of the many patrols over the Fleet's operations off the Belgian coast one of our formations of five machines encountered five large hostile sea-planes making towards the Fleet. These sea-planes were without observers, but each carried a torpedo under the fuselage. A general fight ensued, with the result that one sea-plane was destroyed and the others were driven back to their base. It was the second occasion when torpedoes were used by German air-craft. This incident made me rather anxious as to the shipping in the Downs, and led to our fitting all patrol vessels with machine-guns which were quite efficient against the airmen at the very low altitude at which a torpedo could be dropped by sea-planes.

One captured enemy pilot remarked that there was a good deal of talk concerning the abolition of sea-planes, owing to their shortcomings as compared with land-machines. Certainly the enemy did not seem to get very much value out of this type of air-craft, particularly the large bombers. Numbers were continually being photographed on the Mole at Zeebrugge, but they were seldom observed to be carrying out anything more than low patrols over their own side of the lines. Our experience was identical as to the uselessness of sea-planes compared with aeroplanes for coast work.

In the autumn of this year the Flanders Command of the R.N.A.S. reached the culminating point of its bombing power, of which full advantage was taken. There were two complete squadrons of Handley Page machines at Coudekerque, and one squadron of D.H. 4 machines at Petite Synthe, which had

replaced the Sopwith bombers in July. The Handley Pages were used every night when bombing operations were possible, and the weight of bombs dropped on single occasions sometimes exceeded eight tons. The total weight released upon the enemy since the formation of No. 7 A Squadron was watched with great interest as it climbed up to the 100-ton mark. This event occurred in August, and was duly celebrated, and when the figure rose in October to 200 tons, it became the occasion for a great dinner in the Coudekerque mess, to which all the officers in the command who could possibly be spared and accommodated were invited.

The enemy had quite a number of new aerodromes under construction, and these were watched for any signs of active occupation. It was found that practically all the Gotha and Giant machines were operating from the district around Ghent. St. Denis Westrem was one of the original aerodromes used by this type, and during the past year others had been built at Aertrycke, Sparrapelhoek, and Maria Aalter, while the Gontrode aerodrome had been made suitable for and was now being used by large bombers. A very extensive new aerodrome was observed under construction at Scheldewindeke, and this was obviously intended for bombing-machines. There were three large sheds, each capable of holding a considerable number of air-craft, and the centre of the extensive landing-ground was laid with concrete. Two strips of concrete were laid in the form of a "T," thus enabling machines to take off in any wind. Each of these strips was over fifty yards in width, and some hundreds of yards in length. Special electric landing-lights were sunk in the ground and supplied with current from two power-houses built on opposite sides of the aerodromes. All these aerodromes were visited by our bombing-machines whenever a respite from their other duties permitted, and considerable damage was inflicted from time to time upon the hangars, workshops, and machines.

The large American flying-boat, operating from Dunkirk, got her first submarine on September 22nd. While on patrol

between 7.20 and 9 a.m., she observed a big submarine fully blown at about eight and a half miles north-east of the East Hinder Bank. Two 230-lb. bombs were dropped from a height of 800 feet. One of these struck the submarine just abaft the conning-tower. Immediately after the explosion, the submarine was seen to heel over and sink, leaving a large quantity of wreckage and oil floating on the surface of the water.

On the same day, during a bombardment of Ostend by the monitors, one of our patrols of three machines encountered three hostile sea-planes, all of which they destroyed. The first to go down was a two-seater. The observer was shot and the tank riddled with bullets so that the pilot was forced to land on the water. One of our machines was also forced to land on the water owing to lack of pressure. Both pilots were picked up by the ships. The second hostile sea-plane was shot down and crashed into the sea, while the third was forced to land owing to his engine being hit.

It was at this time, the end of September, that the Germans made their determined attack on the Air-craft Depot and No. 1 Wing at St. Pol. The German report, which reached Dunkirk some few days afterward, stated that forty tons of bombs were dropped during the week; this was in addition to a number of shells from the Leugenboom gun. This attack proved an apt illustration of what could be done by intensive bombing. The damage caused was certainly very great, and serious disorganisation of our aerial activity would have been caused had the attack been carried out in the spring instead of at a time when bad weather was at hand and flying activity was on the wane. However, as it was, some rapid thinking had to be done, and within a few hours a plan was formulated and instructions issued as to the policy to be followed, in consequence of what was practically the demolition of the depot at St. Pol.

This depot was immediately decentralised, and an air-craft park established at the Frontier aerodrome to deal with the

repairs to the fighting squadrons of No. 4 Wing. A sufficient number of officers and men were transferred hither from the depot. A certain number of skilled mechanics were lent to each of the other squadrons in order that, as far as possible, the work of repair could be temporarily carried out on the spot. To each squadron attached to the R.F.C. were sent a small number of engineer and carpenter ratings to assist in repair work, and two additional machines were sent as reserve in case of emergency. Several officers and 150 men were sent to Dover, where an acceptance park was established to deal with fitting up and testing the new machines as they arrived; the machines being flown over to squadrons in Flanders as required.

In addition, a Plane Repair Section was hastily fitted up in Malo, and a sufficient number of officers and men were detailed for this work.

The question of stores was a serious one. For immediate requirements, the squadrons were supplied with considerable quantities of spares, etc., with which to carry on until a new store depot could be equipped. Suitable accommodation was found near Coudekerque, where advantage was taken of a number of large warehouses that had been used by the army for storing forage. These buildings were taken over, and a rapid transfer of material was effected from St. Pol. New supplies were demanded, and very soon what was known as the Naval Aircraft Supply Depot was in running order.

In order to eliminate as far as possible the great variety of supplies, occasioned by the use of so many different types of machines, the Sopwith "Pups" were all withdrawn and replaced by Camels. As soon as this was effected the same policy was adopted in regard to triplanes, thus leaving only D.H.'s and Sopwith Camels to be catered for, the Handley Page squadrons being, as before, almost entirely responsible for their own supplies and repairs.

The preparations for the necessarily increased aerial operations to be carried out in the early spring, were now put in

hand. Captain Lambe forwarded a request for additional squadrons of both fighters and bombers to bring the establishment up to—

8 squadrons of fighters.

4 " " Handley Pages.

2 " " Daylight bombers.

1 squadron " Photography and reconnaissance.

1 " " training fighters.

1 " " training bombers.

1 " " large American sea-planes to comprise
 six machines.

To meet these requirements, the aerodrome at Petite Synthe was enlarged, and the erection of a camp for a fighting squadron put in hand. It was intended that a squadron of D.H. 4 bombers should also operate from this aerodrome. Another camp was to be erected at the Middle Aerodrome to accommodate a squadron of fighters, and preparations for receiving one of the Handley Page squadrons at Capelle were commenced.

In the meantime, advantage was to be taken of the winter months to give as much rest as possible to the pilots who had been through such a strenuous time during the summer. Arrangements were made for one squadron to rest at Walmer, and another at Dover, and as much leave as possible was to be given to those who were forced to remain on active service.

The lighter-than-air section of the Dover Air Force was stationed at Capel between Dover and Folkestone, and at Polegate near Beachy Head. The duties of these airships, as previously mentioned, were to patrol the waters and keep submarines from resting on the surface. Long and arduous patrols were carried out whenever the weather permitted; but this form of aircraft was far more often forced to remain idle through adverse weather than the other branch of the air service.

Improvements in the small air-ships, or "blimps" as they were called, were introduced at Capel under Lieutenant-Commander Cunningham, a new chassis being designed and built, which reflected great credit on the designers. It is extraordinary to relate that, when the results of the first trials were forwarded to the Admiralty Air Department, a reply was received saying that they strongly objected to officers trying to effect improvements in material, and asking by whose authority this particular design had been tried. Fortunately I had taken a great interest in the labours and zeal of these young airmen, and had watched the progress of construction of the chassis, and I was able to say that I had given approval, and the opportunity was afforded me of pointing out the foolishness of trying to check initiative of this nature among young officers, especially in war-time. The result was amusing, since the very design that had been the cause of this bureaucratic outburst was adopted shortly afterwards for all small air-ships subsequently built.

Experience of air-craft on the Belgian coast during the war leads me to emphasise two points which deserve the attention of those in authority.

First, although the pilot of the single-seater fighter is, *par excellence*, the cavalryman of the air—the dashing, quick-moving fighter whose brain has to respond with a speed enhanced by the rate at which he is travelling, and the rapid tactics of his opponent—he is not the only man of value to the Admiral. He and his confrères are the backbone of the fighting force to gain supremacy in the air, and are the pick of the pilots. But—and a big but—we must not forget that the observer is only just second in importance to the dashing pilot. A good observer is worth his weight in gold to the Admiral in the absence of photographic reconnaissance. His qualifications for coast work are most varied. He should distinguish between classes of vessels. Frequently I have had destroyers reported as battle-ships, nor is the mistake one easy to avoid, without concentrated attention to com-

parative detail. He should be able to judge of movements of troops, to spot, to pick up detail, and should possess many other virtues. There are a hundred first-class pilots for each really first-class observer. It is my matured conviction that no post should rank higher nor obtain more recognition than that of skilled observer.

The other point is that every sacrifice should be made to give squadrons periodic rest in war, and individual youngsters, on joining up, graduated training in fighting. I know it is difficult. I am familiar with the usual arguments: "We must use them at once; we are so short, we may lose command of the air; we have not sufficient squadrons to allow for rest." I know all these arguments; but an immature pilot, pitted against one inured to air combat, is generally shot down like a young rook. It would have paid to have given him a graduated schooling, even if it delayed his full fledging for a month or six weeks.

Again, a tired, worn pilot is not worth half a fresh one. To see, one by one, the men of a squadron fall out, "missing," not returned, with nothing in front of the remnant but the same old daily work and hard fight, cannot but react on the brain-power of the individual. It is essential to give men rest. Rest does two things. It recuperates their nervous system and it gives them something to look forward to, a well-earned respite, with the knowledge that, after the rest, fighting will again be undertaken with renewed vigour. The man who works a machine to destruction through want of overhaul is not a good works' manager; he will not increase his output of work by such methods. The man in command who works his airmen until they melt away through impaired fighting efficiency for want of rest is no leader; he will not get the best out of his air force. This principle of rest following work should be recognised and allowed for in allocating numbers, and adhered to in spite of seductive reasoning. Men are merely human, even if airmen and heroes.

I cannot end this chapter without expressing admiration

for the work of the Admiralty Air Department under the guidance, in turn, of three distinguished officers—Commodore Murray Sueter, Rear-Admiral C. L. Vaughan-Lee, and, finally, Rear-Admiral Godfrey Payne, who grappled with the difficulties of supply of both personnel and machines. The advance between 1915 and 1917, both in types of machines and rapidity of supply, was phenomenal. Acquainted as I am from experience with the immense difficulty of supply, when types are undergoing constant change, I look on the results of the work of the Air Department as truly marvellous.

Undoubtedly, now we are at peace, with the anxieties of war only a dim memory, evidence of extravagance and waste of money will shock many who know nothing of the difficulties and have forgotten the urgency of supply. Let us be broadminded and fair, and remember when we listen to criticisms of how expenditure might have been saved, that in all probability it would have been at the expense of rapidity of production of weapons on which the success of our arms largely depended.

I feel that what I have written contains a mere outline of the activities of the R.N.A.S. attached to the Dover Patrol. The services of these aviators were invaluable. The number of incidents of bombing or fighting in the air being thus included in one chapter may perhaps have been found wearisome from the similarity of details. Yet these exploits were less than one-hundredth part of the fights, bombings, and patrols carried out, and not one has been included that did not present some feature of novelty or interest. These air-men of the Dover Patrol not only did our work by sea and land, but held out a strong helping hand to the Army, both by taking over a considerable sector in the north, and by lending assistance to the troops on the Somme. Their gallantry was beyond all praise. Their morale and efficiency may be directly attributed to Captain Lambe and the Squadron Commanders working under him.

THE STRAFE OF THE KITE-BALLOON

Do you mind you, brave Mackenzie, when I stood by your machine
Out Petite Synthe three years or so ago,
When you told me of your exploit full of life, and oh ! so keen,
With a modesty that made your action glow ?

How you planned and how you practised every detail of attack,
In your scheme to fire and burn that kite-balloon ;
When first you tried misfortune came and forced you to turn back,
But you tried again that very afternoon ?

How you rose and circled widely till you gained twelve thousand feet,
Then you turned and passed Braye Dune and Adenkerke ;
How you always kept on rising high in order to defeat
All the anti-aircraft guns that were at work ?

How you sped wide of your quarry then in order to deceive
And lull suspicions of your real intent,
To foster false security and to make the Hun believe
You were scouting—so you put him off the scent ?

Then, when Ostend locks were traversed, you swung sharply t'wards the sea,
And saw your prey distinctly far below.
And I saw your eyes were sparkling and reflecting the past glee
With which you dashed to meet your long-sought foe.

How you steered until that silver streak lay shining underneath,
You dived and dropped at almost lightning's speed,
With your eyes intently focussed, and your jaws with fast-set teeth ;
You then proved your warrior ancestry of breed.

How the silver streak grew larger, slowly first, then swelled apace,
It grew and filled the gauge at bursting rate.
How you fired the rockets truly with the back-fire in your face
And then waited calmly for an unknown fate,

While you counted five quite slowly for the rockets to get clear,
Still diving at two hundred miles an hour,
You kept rushing ever downwards in your gallant, mad career
Gaining speed as if propelled by magic power.

Then at last the five was counted and you straightened from the dive,
The strain to check the fall near broke the plane.
But the wood and wire and fabric just managed to survive;
Unharm'd you gained a normal course again.

But the wait of those five seconds took you tearing just below
The flaming mass that roared above your head.
While your wing-tip missed the mooring-rope by just an inch or so,
And, somewhat scorched, you turned for home and fled.

Flying low down to the sand-dunes—you had had no time to rise—
As gun and rifle crashed in angry din,
Just to zig-zag was the only thing your brain could then devise,
But it served to bring you through and let you win.

Oh! the glory of that fly back with each nerve vibrating still.
The triumph of the fighter who has won!
With each memory evoking an exhilarating thrill,
And the knowledge of a proud deed nobly done.

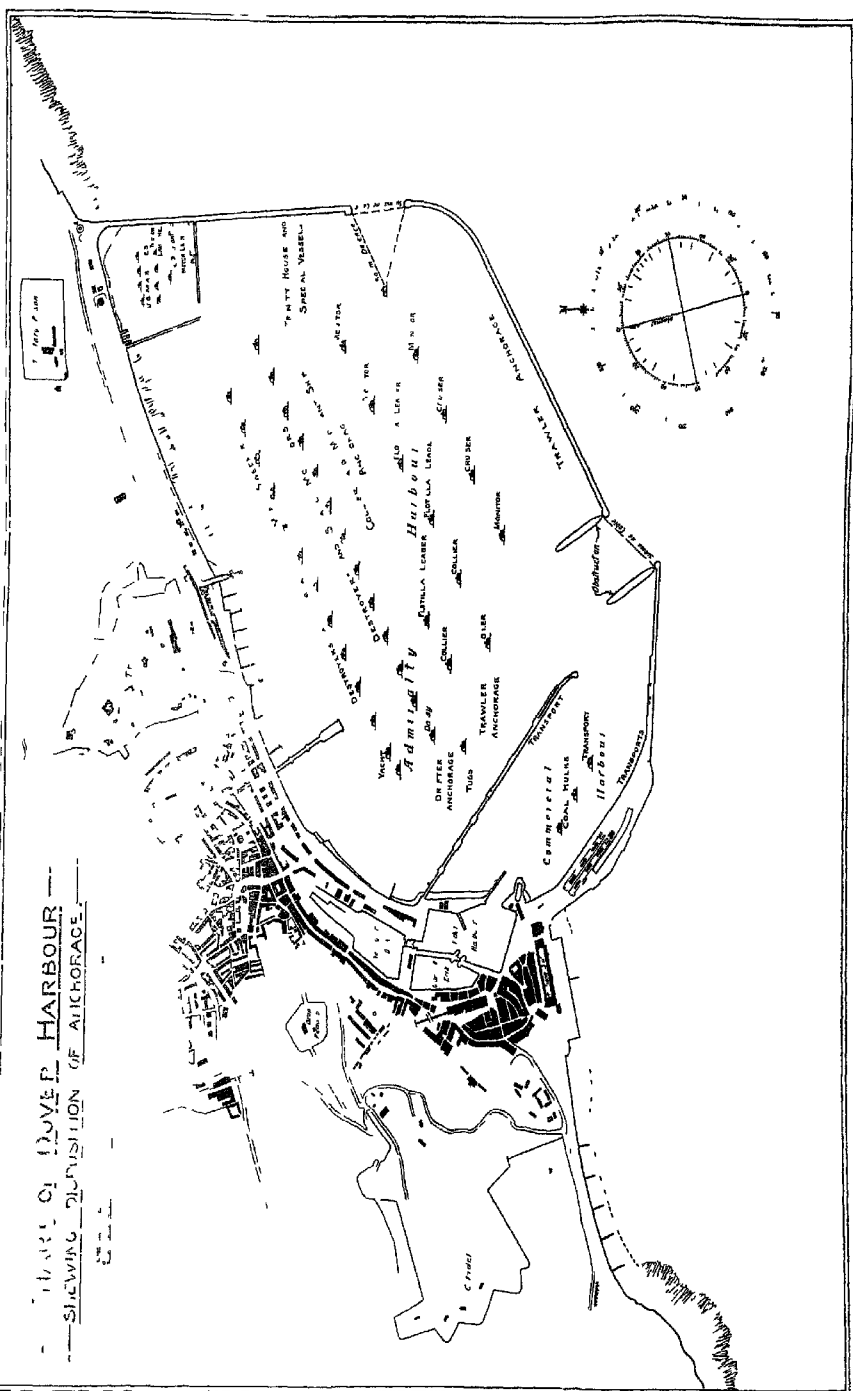
I remember, as I listened, that I stroked your mascot's head—
A little Teddy bear securely tied;
And I asked if he was with you, and how laughingly you said
That in all your stunts he sat close by your side.

Did he play you false, that mascot, that small black-and-yellow sprite?—
Or was he lost, or took the bullet too?—
That he did not save his master in his last misfortune'd fight,
When there died as brave a man as ever flew.

Tell me, where are you now resting? And your ashes, where are they?
The Somme's grim battle-field alone can tell—
Only "missing"—that one word is all we heard of that last fray,
And all we know of how your end befel.

Though you left us naught of ashes to be honoured here below,
Your memory we'll honour to the grave.
Your example nobly shines among those memories that go
To inspire men to be gallant and be brave.

— NAME OF DOVEY HARBOUR —
— SHEVING DIVISION OF ANCHORAGE —



The submarine boats lay in the inner harbour at the north-east corner. The *Arrogant*, their mother-ship, was moored there also. In bad weather the swell penetrated even the second harbour, and on one occasion she parted her stern hawsers owing to the "send" of the sea. This little harbour was also useful for the motor-launches and harbour boats.

On the west side of the main harbour was the Admiralty pier, devoted entirely to hospital ships under Captain Bairnsfather, C.B.E. The large new harbour station, which was only completed after the commencement of the war, was invaluable as a resting-place for the wounded passing through. Immediately opposite the Admiralty pier was the Prince of Wales's pier devoted to drift-net fitting, and instructional classes in signalling. It was also used as a store-house for the spare gear of drifters and trawlers as well as being the embarkation jetty for the crews of these vessels.

Between the two piers was the commercial harbour, into which set a nasty sea in easterly gales. It was in this harbour that torpedo-boat No. 24 was wrecked. Going in to oil alongside a small oiler, she found both sides occupied, tried to come out, got broadside on to the sea, endeavoured to anchor but dragged, and drifted to the end, holing her bottom on some rough blocks of stone. I was sorry for her captain, as his only chance, really, was to ram the pier, risking the damage to his bow, and steam round with his nose against it, but such a procedure is not likely to occur once in a life-time.

The end of the harbour led through a lock-gate to the Granville dock, a non-tidal basin devoted to trawlers and cross-Channel steamers under repair, and also to small railway steamers for carrying railway stores to the troops in France.

Another basin, the Wellington Dock, was used by the drifters standing off, and had a slipway large enough to accommodate drifters. Immediately outside this dock was a tidal basin used by drifters taking in nets, where they rested on the mud at low water. The level quay adjoining provided a valuable ground for laying our nets for bending to their

jackstays. The Naval pier was used as the local signal-station and for wireless communication with destroyers. It was also the main landing-place for the crews of the men-of-war.

The dockyard occupied the north-east end of the harbour jetty. At the commencement of the war, it was quite small—practically only a works building-yard—but it grew considerably during the subsequent three years. It suffered from want of railway communication with the main line. It was always possible to effect this by running a temporary line along the esplanade, but it was one of those inconveniences to the locality which one hesitated in perpetrating until it became necessary. The project was, however, carried out by my successor.

In the original plan for the submarine harbour as drawn up, provision was proposed for berthing destroyers as well as submarines, and a tunnel through the cliff was projected to give communication with the main line. Want of money led to the abandonment of this scheme. On the whole, I am not certain that a larger inner harbour would have been altogether an advantage when the disadvantage of the increased sea in bad weather is taken into account.

The harbour was regulated by the King's Harbour Master, and originally this officer was the Naval Head of the Dockyard. Captain Arnot Henderson ably filled the post in 1914-15. Later on, when the patrol had expanded, this officer was succeeded by Rear-Admiral Heathcote Grant as Admiral Superintendent of the Dockyard, who was of the greatest assistance to me. It was with great regret to all that, early in 1917, he was appointed to the important post of Admiral and Senior Officer at Gibraltar. He was succeeded by Rear-Admiral C. F. Dampier, who filled his place with energy and ability.

The works side of the Dockyard was under the charge of Mr. Shortridge, C.E., for most of the time during the years 1914-17, and much onerous work fell on him. The

engineering side of the Dockyard I placed under Engineer-Captain Parsons, C.B.E., the Engineer-Captain of the 6th Flotilla, a capable and hard-working engineer officer.

At the commencement of the war Dover had merely a small submarine base. The 6th Flotilla of destroyers was at once sent there, and the organisation of an engineering side to the dockyard equipment was commenced to deal with the necessary repairs.

The shops of the Dover Engineering Co. were taken up on the net cost percentage system of Admiralty Control, and a local arrangement made with the S.E. and Chatham Railway Shop, while Messrs. Palmers, Sheet Metal Workers, Dover, were afterwards requisitioned.

By 1915 a considerable increase had taken place in all classes of vessels, and it was beginning to be recognised that the war might be a prolonged one. Additional and larger temporary workshops, known as "6th Flotilla," comprising those for engineering, constructive, and electrical work, were then built in the Dockyard, corresponding expansion being obtained in fleet labour for the engineering work.

Up to 1916 the stokers of the ships did their own boiler-cleaning, but to ease these ratings during stand-offs, and to obtain a more efficient system applicable to the newer T.B.D.'s, a boiler-cleaning party was established, R.N. stokers being obtained for this purpose from the depots, and lent to ships during their periodical stand-offs.

At the end of 1917 the Patrol comprised over 400 vessels—the largest auxiliary patrol in the country; for which upkeep, engineering repairs, minor additions and alterations, periodical inspections, etc., had to be provided; while assistance had to be given to colliers, transports, air-stations, motor-lighters, boom defence machinery, Dunkirk shore naval defences, dockyard plant, tugs, steam-boats, motor-boats, and water-tanks, and local salvage operations had to be carried out. Work at Dunkirk, Folkestone, and Ramsgate, and with various smoke-screen, submarine-netting, gun-sighting, and

other war experimental work, was continually in progress. So that the base engineering requirements were many and varied, and without the Dockyard the efficiency of the Patrol could not have been maintained.

The need of some convenient fleet repair shop was felt for the vessels using Granville Dock, which is remote from the Dockyard. A disused steel-lighter belonging to the Works Department was found, and, with Admiralty approval, fitted up, mainly by fleet labour, as a repair vessel—known locally as H.M.S. *Mussel*—a boiler, lathes, drilling-machine, smiths' and coppersmiths' forges, vice-benches, air-compressor, dynamo, and store-room for tools and pneumatic plant being installed. The dynamo gave light to T.B.D.'s during stand-offs.

Shop repair work was done at the 6th Flotilla shops, the first overflow being to S.C.E. (the Superintending Civil Engineers') shop. This employed about thirty civilian mechanics, and did excellent work under the able foreman, Mr. Ramsay. Beyond this, repairs went to the Dover Engineering Co. under the very willing direction of Mr. V. Elkington, the managing director. Other casual defects were attended to by the S.E. Railway Shop.

Ships returning to harbour with breakdowns were dealt with immediately, a night duty party of E.R.A.'s being always in attendance. For urgent defects the only paper work required was a label marked URGENT on the item sent to the workshop. In order to prevent congestion of work in one dockyard shop with slackness in others and to avoid duplication of special tools, I placed the Engineer-Captain in general control of all engineering repair work.

Owing to the reduction of the number of submarines at the Base, and consequent slackness occurring in the submarine workshop in 1917, the repair duties and engineering supervision of M.L.'s was placed under the submarine engineer officer—a special repair party being obtained.

The coastal motor-boats' base was removed from Queenborough to Dover, with the Engineer officers and repair staff

of E.R.A.'s, a special workshop being built for them in the Dockyard.

With Admiralty approval in 1917, an earlier type motor-lighter was obtained, and completely fitted out with salvage pumps and gear. This was a flat-bottomed, sea-going vessel, which provided also shelter for workers, and it proved of very valuable assistance. A considerable number of smaller vessels was salvaged locally. From others the valuable parts were removed.

Early in the war "wrapperitis"¹ developed in the Yarrow boilers of some of the French T.B.D.'s, this being a new experience to them. Assistance was afforded by the Dover engineering staff, who had considerable experience in dealing with the trouble.

Many new services were developed in the Dockyard, experimented with, and adopted during the war. One, I particularly remember, was a device to prevent flaming at the funnel, an ailment to which vessels fitted with semi-Diesel engines were particularly liable. The work was carried out by E. R. A. Jenkins under Engineer Lieutenant-Commander Yates, and cured the evil as well as adding 15 per cent. of efficiency to the engines.

I can recall no one single case of failure owing to lack of care or of efficiency on the part of the engineering staff or complements of the Flotilla both on shore and afloat. A fine record for three years of war service!

The defences of the port were in the hands of the military officers, Brigadier-General Crampton being in command in 1915; he was succeeded by Brigadier-General Bickford. The most cordial relations existed between these officers and myself, and in every way they did all they could to facilitate the naval work of the port. The arrangement, however, whereby the fixed defences of a naval harbour are in the hands of any one but the naval officer in command is illogical, and cannot be so efficient in war-time as if that control is vested in him.

¹ Wrapperitis is the term we applied to the development of cracks in a certain wrapper plate in these boilers.

The control of the civil population, the keeping of order in the town, etc., constitute the proper function of the military, and it is work that does not affect the naval command; but surely, the harbours, control of the examination service, and the control of the batteries able to fire on vessels should be under naval command. This is more especially the case when auxiliaries, unaccustomed to naval routine, such as trawlers and drifters, frequent the harbour, as these vessels are often in trouble over the "signal for the day,"¹ and at other times have to come in and out for special work. Much common sense has to be used, and in the case of Dover, if it had not been for the exercise of such qualities on the part of the military, half the drifters and trawlers might have been sunk by our own batteries. Frequently I received well-grounded remonstrances from the military authorities as to the way some of these little tired vessels tried to come in regardless of etiquette. My invariable answer was: "I am sorry, but we deal with irregular and semi-trained forces. For goodness' sake continue as hitherto to exercise common sense, or we shall be having regrettable incidents. The enemy is not going to try and take the harbour with trawlers and drifters. They have none." It was not fair on the military authorities, but it could not be helped.

This, however, was not the really important line of contact between the control exercised by the two forces. Five minutes' raids exposed the weakness of the dual control. If enemy destroyers fired at Dover, of course the military had guns at their disposal, and I, on the other hand, had destroyer patrols. The enemy would probably have tried to bombard at about 8,000 to 10,000 yards, firing blindly at the town. The batteries would have had nothing but flashes in the night at an unknown range to fire at, and could not possibly have distinguished the flashes of the guns of our destroyers from those

¹ The "signal for the day" is a signal used by all naval vessels in war-time when approaching a harbour. As it is changed daily, there is little chance of the enemy discovering it in time to make use of it.

of the enemy. As the best chance of engaging successfully and driving off the enemy boats lay in close engagement by the patrol, and not long-range blind firing, I requested the General not to fire on such occasions unless I asked him to do so. Naturally such a request led to conferences in London in 1917, when it was decided that the procedure should be reversed and the guns should fire at once, but cease firing when I asked them to. This suited me equally well, but, in order to save unnecessary delay, I left a standing order that whenever the military returned the fire of an enemy shelling the neighbourhood, automatically a message was to be sent asking them to cease fire, as our patrols were close at hand at this period. It might have been necessary to fire on a vessel approaching for blockading purposes—although very unlikely; but still, from the point of view of military responsibility, the reservation of the right to return the fire was advisable, but this was antagonistic to the naval situation.

The sensible arrangement would have been to have placed the battery commander directly under the Admiral, who would have known the exact position of the patrols at any given moment, since the patrols in the offing turned at certain points at definite times, so that the position of our destroyers was always known to me to within a few hundred yards. The closeness of the nearest patrol to a raider could therefore be gauged instantly by me, and I was in a position to judge whether the battery fire could be safely used before the situation developed. It was proposed that there should be a liaison officer with the Fire Commander; but I always hold that an advisory person is useless. The infallible law, when at war as distinct from peace, should be that the person who is given command should be he who has the knowledge, since on him lies the responsibility. It is useless to have persons in command with other people to tell them what to do.

I venture to say that seamen are as good gunners as the Royal Artillery, so that no objection on this score exists. The Royal Marine Artillery would make excellent gunners for

naval port defence guns. But then we, as a country, never exercise common sense in our preparations for war. We seem to love to hedge ourselves in with anachronisms which cannot stand the test of logical argument, and therefore create difficult conditions in war-time.

If I remember correctly, when the question of whether the Army or the Navy should control the fixed defences of our naval harbours was decided, the governing argument was not which was the most efficient, but the defences were placed under the Army, as the Admiralty did not wish to increase the total of the annual Naval Vote. It looked so bad on paper to jump up a million or so on the estimates when every penny for essentials had to be fought for. The fear was that the cost, appearing in the Navy instead of the Army Vote, would indirectly and adversely affect the vote for new construction. This led to a wrong allocation of responsibility in war-time.

The possibility of Dover harbour being blocked by the enemy raised issues of some interest. The feat would have been a comparatively simple one, and one moreover against which defence would have been difficult. The requisites were a dark night and fast ships. The patrols were so weak numerically and it was so impossible efficiently to cover the 20-mile entrance to the Channel, that it would have been by the veriest good luck if the Germans had been observed in time for effective action to be taken. I had had to withdraw the torpedo-boat that cruised off the harbour, to help in the Downs, as soon as I had gauged the want of sea initiative of the enemy, and therefore this, the real defence, was non-existent. The blocking ships might have struck the normal traffic-line which ran only one mile from the entrance, and proceeded along it with the other traffic till opposite the harbour; then a sudden swing of eight points towards the harbour at a speed of twenty knots would have meant only a bare three minutes for the ship to be discovered, the alarm to be given, and the guns to open fire. The constricted route which obtained at Zeebrugge from the Mole end to the entrance of the canal, which confined

to one channel any blocking ships, and therefore gave a lane and not a field to defend, was absent at Dover. It is very doubtful, even if a destroyer had been in the offing of each entrance, whether she would have been in time to stop a ship—especially when the strong tides and difficulty of maintaining position, and the necessity for a certain range of cruising on the part of the destroyer for safety against attack by submarine boats are taken into account. At all events, I am glad such a blocking was not tried, as, if it had been successful, it would have been a great nuisance to our ships, the traffic in and out being almost incessant. With the strong tide that set across the entrance, navigation would have been greatly impeded if a partial blocking had occurred.

A good deal of salvage work was carried out at Dover. Fortunately before the war the Dover Harbour Board possessed two magnificent ocean-going tugs, probably the finest in the country, the *Lady Brassey* and the *Lady Crundall*. These were taken up by the Admiralty for examination vessels. However, they were always close at hand, and I fitted up a trawler as a stand-by examination vessel and bundled the examination staff into her in emergencies, when both the tugs were urgently required. The greatest salvage asset, however, was Captain John Iron, the Harbour Master—the third generation in direct descent of Dover Harbour Masters, grandfather—father—son. His family was a direct link between the Dover cross-Channel sailing packets in the smuggler days, and our present fine steamers and prosaic times. What Captain Iron possessed was experience—that much-despised but all-important asset. He knew every soft spot between Portsmouth and the Thames, and where best to beach a vessel. Of weather and tides he had a better knowledge than any one else, and, as a ready, rough emergency leak-stopper, few equalled him. On one occasion he took—accidentally it is true—a vessel to the Thames with nothing but a large chalk boulder stopping a leak; but that is another matter.

After a very short acquaintance, I took him on as Chief

Salvage Officer, and every one but the captains of ships were subject to his directions in salvage. I never regretted the day I did so. The list of salvage operations in the Straits carried out by him—116 vessels—shows how well he worked.¹ Surely a fine record. One tug and a motor-launch were at his disposal day and night, and all reports of collisions, groundings, or minings went straight to him, since it is the first hour in an accident that usually decides the fate of the vessel.

One day a breezy gentleman blew into my office and informed me he had arrived as Admiralty Salvage Officer at Dover. I thanked him and told him I was glad to welcome him as the Admiralty Salvage Officer, but explained that my salvage officer, who had immediate charge of all emergency salvage work, was Captain John Iron. The Admiralty fortunately saw that local experience was the one essential, and left me and Captain Iron in peace.

The work of the shore establishments at Dover deserves special mention. Foremost of these was the Port of War Signal-station, with Commander A. E. B. Greville in charge, and Lieutenant-Commander C. O. Campbell to assist him; incessant day and night duty was the order for these two officers, and it was carried out with efficiency. This station was an important adjunct to the port, as it was the centre of distribution of information to distant stations in the area, and also to adjoining areas.

The *Arrogant* was the mother-ship of the submarine boats, and developed into a sort of small depot and mess for the Motor-launch and Coastal Motor-boat Officers—a useful adjunct to the port.

The Trawlers' and Drifters' Depots were under their respective captains, victualled and supplied, and the accounts kept by paymasters, as in the case of the 6th Flotilla Accountant Depot, which was under Fleet-Paymaster C. E. A. Woolley. The whole of the medical arrangements were under Fleet-Surgeon C. G. Matthew.

¹ Cf. Appendix II.

The naval arrangements ashore for the men, canteen, etc., were under the direction of the Chief of the Staff.

It would be remiss to omit mention of the good work done by the ladies of the port in connection with the widows and orphans of men killed on service. Such work of mercy can be dealt with best by women, and it was of the greatest assistance to the Admiral to have so many sympathetic helpers to do work which was most necessary, and which he was totally incapable of carrying out. There is a silly and small-minded sect in the Navy, or rather there used to be one, which objected to the wives of naval officers and men being in the ports which their husbands frequent. In all my experience I have never known a case of duty being neglected for the sake of a wife or family. Generally the complaint is from the other quarter, that duty occupies so much of the husband's time that too little time is spent ashore. I hope whatever nonsense existed in this respect will have been dispelled by the war. The work done by the wives in the war should in future make the authorities sympathetic to their existence.

The work of the Patrol was so dangerous, so hard and so incessant that I sincerely desired that whenever the officers and men had a day or two off, those days should be as pleasant as possible, and therefore the more wives and families accumulated at Dover the better I was pleased. Air raids, of course, shook some of them up, and their children were particularly affected, but they showed a courage almost universal both in such times of alarm and also in, alas, the frequent bereavements which strewed the wake of the daily work of the Patrol.

Air raids occurred at intervals, but fortunately the Admiralty gave me two 6-inch high-angle guns, and I mounted one on the eastern arm and one on the Prince of Wales Pier. They thus covered the whole sky above an elevation of 30°. I remember one night seeing a Zeppelin coming up from Folkestone straight for the harbour. A 6-inch shrapnel burst a short distance in front of her. At once she altered her

course out to sea and dropped her bombs in the water. We were never again visited by Zeppelins.

During the Zeppelin raids on London, I tried to waylay these pests in the mouth of the Thames by sending the 12-inch monitors to line across the estuary. They could only get 30° elevation on their 12-inch guns, but the Zeppelins usually flew low in making the land, so there was a chance of bagging one. The following remarks to guide the monitors written at the time may be of interest. They were issued on December 20th, 1915 :

“The object of placing the monitors across the estuary of the Thames is to try and intercept Zeppelins arriving to attack London. The simplest way for a Zeppelin to locate London is by striking the Thames. By keeping in sight of the Thames, the outskirts of London can be identified and the city then approached on any bearing.

“The coast to the northward and southward of the estuary may be steered for and course altered along it till the entrance of the river is made.

“This means that any point in the estuary may be traversed by a Zeppelin.

“The general idea of the defence is to place five 12-inch monitors across the estuary from Clacton to Margate, five miles apart, and two miles outside that line. Intermediately between the 12-inch monitors, four M. class monitors will be anchored to give notice of approach, locate the Zeppelins with search-lights and signal the azimuth bearing of Zeppelins to the ships concerned. The elevation of search-lights has been increased to point vertically. The elevation of the 12-inch guns is 30°, and at 30° elevation the line of axis of the gun passes through a point 5,190 feet high at 3,000 yards, and the shot would drop very little in this distance.

“A Zeppelin making the land, especially on a dark night, would probably be at a low altitude, less than 5,000 feet, so that there is a good chance of obtaining a shot at between 3,000 and 5,000 yards range.

“If the elevation of the gun is increased to 38° the axis of the bore will pass through a point 7,100 feet high at 3,000

yards. This raises the question whether the monitors should list over by filling a bulge. This must be left to each individual captain to decide.

"The points to be considered are :

"*For listing :*

"(1) Increased chance of being able to fire at a Zeppelin at a given range, by being able to fire at a greater altitude.

"*Against :*

"(1) Being only able to fire when the Zeppelin is nearly abeam. This can be discounted to a certain extent by slipping and being under way.

"(2) Having either to pump out and fill other bulge as ship swings (a rather lengthy proceeding as the tide changes), or,

"(3) Having to shift from bow to stern mooring. Best done by a 3½-inch wire with a slip between it and the cable.

"In any case the ship should have steam on the engines, and be prepared to slip instantly, to bring the guns to bear or keep them bearing. Each captain must judge according to the time of change of tide, whether he will list his ship or not.

"Grounding need not be minded, compared with the destruction of a Zeppelin; of course every precaution should be taken not to ground, but no great harm is done if, in manœuvring, the ships do ground.

"The tide will not be high at the time Zeppelins may be expected, and, if the manœuvring space is small, the bulges can be flooded in advance, which gives a means of lightening the ship 14 inches.

"If a ship grounds, anchor at once, and do not move the engines, and so fill the condensers with mud, but wait for tide to rise and pump out bulges.

"The small monitors should first discover the Zeppelin and fix a search-light on it. If two small monitors have search-lights working, the Zeppelin will probably try and divide her distance equally between them, and so steer for the large monitor. Discretion and thought are required as to the use of search-light on board large monitors. Open sights may be required. It will probably be best to fuse one shrapnel for

4,000 yards, and the other for 3,500 yards. The small monitors should signal the azimuth angle between the Zeppelin and the line joining her and the M. class monitor on the far side of the Zeppelin, and signal in degrees and minutes right or left of the line.

"Results from two monitors should give a rapid and approximate fix for range, using a cardboard diagram to obtain at once the fix by inspection. The difference between the horizontal and direct range is well within the cone of the shrapnel burst."

One of the chief events at Dover was the inspection of the Patrol by H.M. the King. It may be difficult for some persons perhaps in these extremely democratic days to realise how much good this visit did to the Patrol. Hitherto officers and men of the Patrol had looked on their work as prosaic. True, they were at war and were doing their bit; but the fact of the King thinking it worth while to come to Dover and inspect the various activities at once brought home to them the national importance of their services in a way that nothing else could have done, and their morale was greatly strengthened. The trawler and drifter crews valued immensely the fact that the King boarded one of each of these craft and examined the details of their accommodation and their war appliances. I was glad to have the opportunity of presenting Lieutenant-Commander Gar-side Tipping to His Majesty, as the oldest officer serving afloat. Next day he was killed in action with the King's congratulations on his patriotic service still fresh in his mind.¹

We who command are apt to forget how much commendation is valued by those below us. Most of us are not impressed by the status of our appointments, since we have gradually and slowly grown to acquire rank. It is most important for those in command to realise the manner in which any approval they may express is treasured by those under them. I have been much struck, in writing these chapters,

¹ See page 90.

to observe how approbatory signals have been jealously guarded, and given prominence to in the records of the Patrol which were kept at the time ; and conversely occasions when praise due has been omitted must have produced a corresponding feeling of neglect. It is one of those human factors to which, in the stress of war, one is apt to pay too little attention.

The Dover Patrol owes a considerable debt of gratitude to the Mayor of Dover, Mr. Farley, the Corporation, and many inhabitants for their kindly help and generosity. No occasion for helping the Patrol was ever neglected. It is impossible to mention all who so kindly assisted the men and their wives. They are too numerous, and I hope the omission to do so will be forgiven.

This brief description of the activities of the shore establishments ends these chapters at the same spot as that at which I began—the Port of Dover—which place in war was destined to have its name associated with the naval activities in the waters of the Narrows of the Channel. The geographical position of Dover was one of great strategical possibilities, but these lay dormant till the foresight of the Admiralty regime at the end of the last century gave birth to its magnificent harbour. Dover, as it now stands equipped, has been endowed with new potentialities, and during the late war was absolutely invaluable to the country.

I feel, in laying down my pen, how inadequate has been my attempt to convey to the lay mind the vast labours and sacrifices of the officers and men of the Patrol. The motives and reasoning which underlay action or inaction have been given fairly fully, but the daily occupation, dangers, and privations of the Patrol baffle my powers of description. Their work was a long series of emotions and sensations in addition to definite incident. I hope, however, I have said enough to indicate the services not only of the portion of the Patrol drawn from the Royal Navy—for the country has a right to expect devotion and self-sacrifice from its fighting forces—but of the extraordinary aptitude to assimilate war conditions, and

adopt strange weapons which was evinced by the fisher folk and other personnel trained to peace occupations and not to war. In this lies the strength of the nation—in the power of its peoples quickly to adapt themselves to new conditions both by land and sea. Every thinking naval officer and man, in his quiet hours of reflection and forecasting before the war, must often have thought about and been impressed by the immensity of the traditions of the Navy that lay behind us and the weight of the responsibility that rested on us to acquit ourselves in war as our ancestors had done. These volumes deal with one section of our naval forces, a section faced by new and unforeseen conditions. I have told its tale down to a point when it was due to reap the reward of its unrelenting and patient labours, and I have said something of the final operations with which it was associated, which we had initiated and planned. I am content to leave the country and posterity to return the verdict—whether or not our exertions were worthy of approval, and whether as a fighting force of our great Navy we, in their opinion, justified our existence.

THE TIDES

Ye strong, restless tides of Dover, with your ceaseless ebb and flow,
Like unwearied sleepless watchdogs ever prowling to and fro,
Twice a day ye meet the North Sea tides, and with them fiercely sway,
North and southward in the struggle and the fight for the right of way.

From Dover to the Ruytingen, from Folkestone to Grisnez,
Ye scour out the passage cleanly hour by hour and day by day.
Thus the Channel that Old England from the Continent divides
Is swept clear and keeps us sea-girt by the labours of the tides.

But in payment for your labours, ye take toll of those that pass
By dread strandings and collisions and by founderings, alas !
Ever claim your due proportion of our vessels and their crews,
And ye draw them to your hidden lairs to pay the Channel dues.

Are ye friends of ours or enemies, ye tides of double face ?
Ye maintain us safe an island, yet ye take toll of our race.
Speak out frankly, we will listen, for our right it is to know
Why ye work in two directions, like your shifting ebb and flow.

Then the tides replied with chidings, " Ye are either babes or fools,
That ye know not your instructors, neither recognise your schools.
The deep sea has trained your nation, in it fashioned all that's best,
Can ye grumble if in training some are gathered to their rest ? "

" Would ye be the race ye are now if it were not for the sea ?
Look at your late antagonist, realise why he is he.
Had his fathers fought blue waters, had we trained him as he grew,
War had been a different problem—had a different ending too !

" Be ye thankful, ye of England, that the sea is no soft friend
That ye've fought us and will fight us tides unto the bitter end :
Not in anger, not in rivalry, but as the steel the flint,
So the fibre that's born in you is full stamped with our imprint."

EPILOGUE

Now that the various units of the Dover Patrol and their work have been described, however inadequately, let me in conclusion briefly survey the functions of the Dover Force, how they originated, and how they grew.

At the outbreak of war the main use of the Patrol in the Straits of Dover, acting under the orders of an officer with his headquarters at Harwich, was to enforce the examination of merchant vessels for the discovery of contraband or enemy subjects trying to creep into Germany. Plans had been prepared before the opening of hostilities for a limited number of destroyers to carry out the examination service, boarding vessels at sea; only those vessels were to be sent to the Downs that objected to search, or were regarded as suspicious. Of course such examination in the fair-way of traffic was found to be impossible, owing to sea conditions and the number of merchantmen involved. The Downs Boarding Flotilla grew therefore in size, and the Downs developed into a great anchorage for merchant ships.

This assembly of vessels in an unprotected anchorage, representing in hulls and cargoes an immense aggregation of wealth, was regarded at the commencement of the war without anxiety, since the Downs was fairly secure against submarines, and attack by such craft obsessed most minds and obscured clear vision of the varied possibilities of the war at sea. Attention being focussed on the submarine, the latent danger of the destroyer was not fully appreciated. Moreover, was not the Elbe a long way off?

The German advance in Belgium at once emphasised the importance of the Dover Patrol. Gun-fire from long-range

guns at sea, such as ships possessed and the Army did not possess, was demanded to assist in checking the onward wave threatening to outflank the Allied Army and to grasp the sovereignty of the Channel ports of the French coast.

Some 6-inch monitors and an old battle-ship were added to the Dover Force at this crisis, and the waters of the Belgian coast became of equal importance to those of the Narrows. They were, in short, converted into a frontier of the Allied Forces. The Belgian coast became a base of German sea-power on the flank of the streams of our commerce, and of the sea communication with our Army.

Still, there was thought to be no cause for much uneasiness, as it was confidently hoped that a spring offensive in 1915 would throw back the enemy and free the coast before full use could be made of its harbours. In the spring of 1915 questions of victory or defeat lay in the balance, though the nation realised little of the dire possibilities that faced us. I know nothing of the military exigencies that underlay the offensive of that spring. I only point out that the decision not to attack the enemy in Flanders, as Sir John French advocated, was a grave one. The reasons must have been weighty, for leaving the enemy to fortify and entrench himself on the flank of the Armies in France and on the trade route to London and the east coast was associated with grave risks.

The main strategy of sea and land force is inseparable. That of the Navy and Army should, of course, be co-ordinated in one comprehensive scheme, not two schemes; but the execution of the broad outline should be left to the individual commanders.

The occupation of the Belgian coast furnishes an excellent example of this truth. I have no hesitation in describing as a gamble with the fate of the British Empire, the strategy which allowed the Germans to settle down on that coast, to fortify it, and to develop its harbours. It may have been a necessary gamble, but a gamble it was. We could not prevent the Germans occupying Belgium; our unpre-

paredness for a continental war of the magnitude of that in which we became involved made that impossible. But immediately after the first battle of Ypres every endeavour should have been made to regain the coast. With that coast in the possession of an active enemy with sea initiative and large resources—and at that period we had no reason not to credit the enemy with sea instincts—we should, in all probability, have lost the war. All the dangers arising from thoroughly organised raids, which I have touched upon in foregoing chapters, pivoted on that twenty-five miles of coast-line.

The one area sacred to an army in the field, so far as defence and protection are concerned, is its line of communications. To allow an enemy's military forces to settle down on the flank of the lines of communication of an army would be looked on by all soldiers as madness; but that is what we permitted the enemy to accomplish on a magnified scale at sea by their occupation and retention of the Belgian coast. Not only did we allow the enemy to fortify bases on the flank of the essential sea communications of the British Army, the Belgian Army, and the Northern French Army, but also on the lines of communication of the food supplies and main trade routes of a large portion of England.

"Oh, the Navy will look after the sea part," said some. That was all very well; but those responsible for the offensive of the Allied Armies, by allowing an enemy to settle on and fortify the Belgian coast, created the possibility of the Admiralty being obliged to watch our sea commerce in the Channel being ruthlessly destroyed, or at last forced to commit national suicide by dividing the Grand Fleet between Scapa and Dover. That, broadly, is the peril which energetic action on the part of the Germans would have created. It was not one whit less dangerous to this country than if the Navy had allowed the enemy to occupy Dunkirk, flanking the line of communications of the British Army, saying, "Oh, the Army can look after the land part of the war."

As a matter of fact, both Sir John French and Sir Douglas Haig were conscious of the dangers of the situation, and from 1914 to 1917 strove hard to get the necessary backing for a Flanders offensive. I hammered away also. But those responsible must either have found the Allies obdurate or have forgotten the old history of the Flanders coast—how during past centuries the nation had freely spent blood and money to keep our eastern shores free from menace by a Power strong at sea, in order to avoid the complications that would ensue in war at periods of our history even when we had no Army in France dependent on the freedom of the Channel. We, however, folded our hands and smiled complacently, while the enemy achieved this position of advantage during a war which involved every British interest, not excluding the freedom of this country from invasion.

In these favourable circumstances, a farseeing and sea-inspired German Chief-of-Staff would have prepared his blow in every one of its thousand details, silently and relentlessly, during 1915 and delivered it with crushing and deadly effect in March 1916. Well, indeed, may we thank our fortunate star that the enemy had not sufficient sea initiative to probe the strength of our offensive blockade of his coast and fathom the weakness of the forces that lay behind to guard our vital interests in the Channel.

As the Flanders spring offensive of 1915 was postponed, we at Dover had to do the best we could to mitigate the evil of the strategical position. Attacks on Zeebrugge Lock and Ostend Dockyard were carried out as soon as the monitors with 12-inch guns joined the Patrol, in order to create a feeling of insecurity on the part of the enemy as to the value of these bases. Damage, but not vital damage, was done. A close attack on the locks at Zeebrugge was proposed and discussed, but abandoned since we had no means of producing a good smoke-screen at that time; a smoke-screen was an absolute necessity. A plan for blocking Ostend was prepared, which in turn was given up in view of the utter uselessness of blocking

from the practical point of view of keeping in destroyers and submarines, and because proposals were under discussion for landing troops in Ostend, either as part of an offensive on the coast, or as a corollary to an advance farther inland, when the Army would have required to use this port. Reconnaissance revealed that Ostend was defended by a battery which had 50 per cent. more range than our 12-inch monitors, and at Zeebrugge a battery was being installed in the sand-dunes with double the range of our vessels.

In the beginning of 1916 a Flanders advance was again proposed. Ostend and Zeebrugge had by that time, as I have remarked, been defended by batteries which made the 12-inch monitors useless, so a landing in Ostend behind the batteries was under detailed consideration, to be carried out in conjunction with the Army in Belgium and Northern France. The enemy's activity in mine-laying and with submarines in the Channel was increasing, and rendered our intervention all the more urgent.

In order to counteract this latter evil, I laid the Belgian Coast Barrage and started the Coast Patrol. This patrol was maintained to check the egress and ingress of enemy submarines and other vessels moving in and out of the ports on the Belgian coast; to afford us facilities for observation of the coast and the waters between the Scheldt and the North Foreland—that is, those immediately flanking the Narrows of the Channel, to the eastward, through which any offensive force must have passed to attack the Channel; and, lastly, to disguise by pure bluff the weakness of our destroyer force for the protection of the Channel. Mining by the Germans on the English ship routes in the Channel ceased at once, and did not recur until the patrol had to be removed in the winter. I estimate that this blockade of the coast saved the country at least 150,000 tons of shipping owing to losses which would have occurred from mines. And above all, it led the enemy to make an entirely false estimate of our strength in the Channel, and therefore the Germans were deterred

from undertaking offensives on our shipping in the Downs, which might have developed into unparalleled disasters. The Flanders advance in the meantime had been countermanded, and the most perilous time this country has ever experienced in its long history was entered upon.

I describe this as the most perilous time since the question whether the Germans would risk a fleet action or not still lay in the balance. I regarded as possible the threat of a fleet action in the northern part of the North Sea, in order to cover a real offensive by the enemy on the Straits and on our commerce generally. A great game lay within the grasp of Germany owing to her possession of alternative bases on the Belgian coast, which obviated the necessity of forcing the passage between Harwich and the Dutch coast before and after a raid; she also had the choice of places of departure for her attacking vessels, thus forcing upon us the duty of patrolling a very great area of water with exiguous resources of ships and men. To have superimposed the losses of merchant vessels by raids and an organised *guerre de course*, on those due to submarines, and to have closed the Channel to merchant traffic would have brought us face to face with disaster.

To describe this matter fully would involve too many technicalities; but the battle of Jutland, without an accompanying raid by German light forces down south, marked the passing of a great danger-point so far as our shipping and the British Army's lines of communication were concerned.

My three predominating preoccupations in 1916, therefore, were, first, the protection of the shipping in the Downs, and the prevention of a disaster to the country of dimensions previously unheard of in our naval history; secondly, the preparation of plans for turning the enemy out of his Belgian bases; and, thirdly, the protection of the left flank of the Allied Army against a landing in rear. These were the essential responsibilities of the Patrol. Hunting submarines was almost useless and hopeless with the undeveloped

listening appliances then available in waters in which a submarine could dive on approach from the eastward, and, remaining entirely submerged, reappear well clear to the westward, or even sneak through on the surface at night. Barrages and mine-fields, and especially the latter, were the only means of dealing with the submarines, and the laying of mine-fields was delayed owing to inadequate supplies of mines. The turning of the Germans out of the Belgian coast would have eased the submarine situation considerably—but of course would not have entirely removed this peril. It would, however, have minimised the danger of serious destroyer raids.

Minor operations to assist the Allied Armies, such as the attraction of enemy troops to the coast by the threat of invasion, were undertaken; but the main work consisted in maintaining the Belgian Coast Patrol, and proving that with adequate foresight, daring, and caution a force could daily treat with contempt enemy submarines and destroyers while patrolling within sight of Ostend and Zeebrugge. Moreover, the psychological effect of this patrol on the German sea mentality was invaluable.

The year 1916 also saw our system of long-range firing nearly perfected. A method of night bombardment was evolved, and other ideas worked out and stored for future use. The smoke-screen became a practical weapon. By the end of the year the Belgian Coast Patrol had to be raised owing to unfavourable weather conditions, for we had no ships suitable for such work in winter. The 12-inch monitors could not safely face the combination of gales, tides, and shoals—conditions which they were never designed to combat. The barrage from the Goodwins to Dunkirk was also started, and proposals for the Great Landing which was in contemplation were put forward. The new 15-inch monitors with longer range began to arrive, and every preparation was made for heavy bombardments the following year. As the winter progressed mining again became active in the Channel, owing

to our having had to relinquish our grasp on the waters of the Belgian coast; but the previous year's practice in sweeping, and accumulated experience in organising traffic greatly reduced the danger of the mine-fields.

In October of this year the first destroyer raid by the enemy on the Channel took place. Once again I was brought face to face with the possibilities that lay with the enemy of doing us grave injury. The time for action on the part of the Germans, however, was passing, if it had not passed—the end of the period in which it was possible for them to injure our traffic vitally was certainly fast approaching. The time wasted by the enemy had worked in our favour. Destroyers were being pushed on in our building yards, and we had the prospect of shortly receiving large additions to our numbers. Above all, the previous months of sea inactivity had bred dry rot in the German Navy. Such raids as they undertook were not serious attempts to sink, burn, and destroy, but were intended merely to supply those sensational and enheartening incidents which those ignorant of sea affairs, in England as well as in Germany, as events were to show, welcome with avidity.

There are two causes of dry rot. One is due to the inactivity of the crews; the other occurs when naval commanders undertake useless operations in order to bring their names into prominence, or to enhance the prestige of a weak Admiralty. These apparently were the underlying aims of the Channel raids. The Germans had taught their officers to run—and they ran. The safe return of a German war-ship was regarded as of more importance than the sinking of an enemy vessel. Hence we suffered immunity from serious injury. The disintegration, morally and physically, of the German Navy will afford an object lesson for all time.

The year 1917 saw the gradual culmination of our previous two years' incessant work. The Great Landing and advance on the Belgian coast, it is true, never took place, which was a bitter disappointment; but, so far as the Navy was concerned,

the organisation of the landing will not for years be forgotten. The reinstituted barrage and patrol on the Belgian coast made possible the bombardment of the enemy positions. The bombardment of the Zeebrugge Lock showed the large wastage in 15-inch guns that would be required to destroy so small a target, and, as guns to replace those mounted in the monitors were not available, the firings on the lock-gates had to be relinquished. Ostend was deserted as a naval base on account of several bombardments, and Bruges became the only port on the coast useful to the Germans. The installation of 18-inch guns in our monitors, which had hitherto had only 12-inch guns, was therefore commenced, to enable us to bombard this base. Heavy guns were landed, and installed to assist the coast advance. The Goodwin-Dunkirk barrage was completed, and proved moderately successful only, in spite of the herculean labour of the drifter crews who laid and repaired adverse conditions.

The Folkestone-Grisnez mine-barrage was planned in February 1917, and, the mines being received in November, was nearly completed by December 31st, when my command came suddenly to an end. The first submarine was blown up in the uncompleted mine-field before I left Dover. This barrage definitely denied passage to enemy submarines later on. Mine-fields near Dutch territorial waters were also laid for the embarrassment of the enemy, and five, or perhaps six, enemy torpedo craft were destroyed. The attack on Zeebrugge Mole and Canal and on Ostend was planned in the last months of 1917, as a consolation enterprise in view of the disappointment caused by the abandonment of the Great Landing. All these irons were in the fire, all operations were in train, when I was required to leave Dover. But I have this consolation: so complete was the programme on which our energies were concentrated when I gave up the command that, during the spring and summer of 1918, and until the Armistice was signed, no new operation was planned or undertaken by the Dover Patrol that was not in progress in December 1917.

For three years we had fought the enemy with our guns and with our brains. The situation had changed from one of great possibilities to the enemy, and danger to this country, to one of comparative safety for our interests afloat. This change had been effected by relentless and unremitting exertions on the part of the Dover Patrol. We had maintained sea communication with the Armies in France, without intermission, in spite of destroyers, submarines, mines, and air-craft, and our commerce had passed as freely and with almost equal security to and from the Thames as it did in peacetime. We may well claim that the work of the Dover Patrol in 1915-16-17, drew the teeth of the enemy in occupation of the Belgian coast, and cancelled the potential value to the Germans of these bases during the remainder of the war.

One great lesson, which is apt to be forgotten, deserves to be emphasised. We had gauged the mentality of the enemy and had proved that those who ruled his Navy were deficient in the higher attributes which are necessary elements of the master-mind capable of guiding war at sea with success. What are these? In our case so subtle and interwoven are they that they almost frustrate individual detection. The generations of the last thousand years form the loom. Experience gained by daily fights with the sea in all weathers, the brushes with the enemy at sea, the chases, the disappointments, the successes, the great full dress fleet actions, the inspiration of example—these constitute the threads from which heredity, the weaver, fashions a sea-going and sea-fighting race. *L'audace, toujours l'audace*; the instinct of "going for" an enemy whenever seen; the resolve never to brook an insult at sea; the conviction that a glorious example is worth the loss of a ship; that it is "dogged that does it"; that your countrymen have always been "top dog" at sea, and intend to remain so; that constant thought should be used to facilitate action, not to avoid it; that an enemy fought is an enemy crippled, though he get the best of it; and, above all, the instinct to attack on sight with-

out an *arrière pensée*—these are some of the guiding characteristics of a sea-race.

Cradock was right. He lost the *Good Hope* and the *Monmouth*, vessels of doubtful value, as well as their magnificent personnel; but he left behind an example. The blow to our sea supremacy which was inflicted at Coronel, Lord Fisher, with instinctive rapidity of decision and courage in action, promptly took steps to avenge by sending out Sir Doveton Sturdee and the 12-inch battle-cruisers. The battle of the Falkland Islands was the sequel.

To have dodged von Spee's squadron would have left our commerce open to attack, with the probability of damage being done in other seas, but the challenge, and the loss of our ships, brought that speedy retribution which perhaps otherwise might never have overtaken those units of the enemy.

Let us never forget the part heredity plays in creating the sea instinct. Look at the way our fisher-folk crowded to our fleets to do the hard sea work to which their lives at sea had inured them, and for which our Navy had neither the vessels nor the men. As the crews of the old Cinque Port vessels, and the Volunteer Fleet crowded to the flag when invasion by Frenchman or Spaniard was threatened, so our fisher-folk and the officers and men of the Merchant Navy and the Royal Naval Reserve and Royal Naval Volunteer Reserve rallied, unarmed, to do our auxiliary work in the Great War. Nothing but heredity could have inspired the men of the Merchant Navy to sail continuously and calmly when any moment an unseen mine or torpedo might have sealed their fate in the open sea, where all possible succour was rendered practically impossible by the studied frightfulness of the enemy, who deliberately strove to make our seamen cowards, and cause them to forsake their calling.

The state-trained and educated German mind could conceive no loftier impulses than those the German Government instilled into their people. They could not understand that men of other nationalities loved their own countries, and

valued loyalty to their own sovereigns, but could only grasp love of Germany and loyalty to the Kaiser. They had been taught not to regulate their actions by truth and honour, but by expediency. Chivalry did not offer the material benefits that brutality promised, and so they adopted the latter, denying the chivalry of the sea. Not being seamen by heredity, how could they gauge the mentality of seamen free-born and free of the sea ?

In the wars of the Napoleonic era, we won at sea, and won easily, largely because a disastrous political regime had dismissed practically the whole of the naval officers who were royalists and sailors by descent and training, and appointed "good citizens" in their places. In the late war we won at sea, or at all events our victory was made easier, because we were fighting a machine-made personnel in whose veins ran no sea heredity, placed in ships under military discipline and called seamen, with leaders whose strategy was governed by a regard for trickery and cunning rather than by sound principles. In both these fights for existence, separated from each other by one hundred years, we had on our side the priceless gift of sea-heredity, the sinew that strengthens the fibre of the nation and which is augmented generation by generation.

We won the war, not of ourselves, but by virtue of that vast procession of seamen and sea-fighters, from the fore-runners of Hubert de Burgh down to our own fathers—men of the Royal Navy, the merchant traders, the fishermen, whose sea-blood has been transmitted to us through male and female forebears. It is the bestowal of sea instinct by heredity from our sea-folk of the past centuries that is the sure shield of our Empire against all assailants on the sea.

L'ENVOIE

Slowly from the rough material, novel ships, with half-trained crews,
Knowledge came through yet untrodden, unaccustomed avenues ;
Work of days and nights was blended by hard toils' cementing force,
Unforeseen and complex problems yielding to combined resource ;
Scores of workers, stern endeavours, forged a weapon for the war—
For the special operations never entered on before.
Thus the fighting force at Dover grew to manhood from its birth,
Waiting for the time when proudly it would show the world its worth.
Long patrols off German harbours, chance encounters, fed the flame
Of impatient, ardent longings for the day of greater fame.
Through our many disappointments steadfastly we waited on,
Confident the day we hoped for surely would arrive anon.
Fortune's change at length afforded us the chance we long had sought,
All our labours, all experience, all our energy and thought
Of near three years were moulded into serried mightiness,
Contemplating, planning, only thorough whole success.
While the days were passing slowly, waiting for the chosen hour,
While in fervent expectation with accumulating power,
Came a voice from one above me, and these words in accents low :
" I have passed to one the weapon, his it is to strike the blow."
Reeled the brain in dumb amazement. Was, then, all this labour vain ?
Could man merely by appointment suddenly experience gain ?
Could the few short weeks remaining teach the lessons of three years,
Local ignorance supplanting knowledge gained by pioneers ?
Gradually, with grasp relaxing tension of the muscles o'er,
Hands relinquished all they'd fashioned, all that future held in store ;
Turning, bade, with full forebodings, farewell to that comrade band,
Then in silence left the weapon to an unaccustomed hand.

APPENDIX I

NAVAL CO-OPERATION WITH THE ARMY IN THE AUTUMN OF 1914

APPENDED is a short account of the naval operations carried out by the Dover Patrol under Rear-Admiral the Honourable Horace Hood in the early months of the war, when the Germans made an attempt to seize the Channel ports.

The fall of Antwerp on October 9th, 1914, released large German forces which were at once pushed along towards the coast, which was reached on October 17th.

The *Attentive* flying the flag of the Admiral commanding at Dover and all available destroyers left at once for Nieuport; closely followed by the 6-inch monitors—the *Severn*, *Mersey*, and *Humber*.

At daybreak on the 18th the Belgian Army occupied the line on the left bank of the river Yser from Nieuport to Dixmude with advanced posts on each bank of Lombardsyde, Rattevalle, and Mannenskevere. The duties of the British flotilla were to prevent any disembarkation of German troops between Nieuport and La Panne, to check the advance of any troops along the coast, and to impede the movement of large bodies of troops and transport anywhere within reach of the naval guns.

At 7.33 a.m. news was received that German infantry were advancing in open order towards Westende and that the Belgian positions were being heavily shelled from a position one and a half miles north-east of Ostend; it was also reported that a German battery was in action in front of the most westerly houses of Westende Bains, and that the battery could not be reached by the Belgian artillery.

Immediately this intelligence was received the monitors, led by the *Attentive*, moved along the coast, and stopped close to Westende Bains; but the sand-dunes, with which the coast is fringed, prevented the

British naval forces from obtaining a clear view of German troops or of the German position.

As soon as enemy shrapnel from Westende Bains and Middelkerke began to burst around the ships, the British flotilla opened out in line abreast, and engaged heavily all the enemy positions that could be located, and also directed a heavy fire on Westende Bains and on the coast road just inland of the conspicuous houses of the village. From information received at a later date it appears that there was a large accumulation of transport on the coast road, and the fire from the fleet caused much confusion and dislocation of plans.

The naval fire was maintained all day ; towards evening the monitors had used all their ammunition, and firing ceased for the night. All the monitors were struck by the bursting shrapnel, and several men were wounded. The *Viking* burst her bow gun, causing injuries to two men. By Admiralty orders the *Attentive* was recalled to Dover, and the Admiral's Flag shifted to the *Amazon*.

As dawn broke on October 19th, heavy shells were falling all around Nieuport Pier, but the Belgian flag was still flying at Lombardsyde, though the position there was being heavily shelled. Monitors and destroyers commenced firing early, and continued all day. Lieutenant Shoppee of the *Amazon* was installed at Belgian Headquarters, and remained there during all the operations, keeping up wireless communication with the flotilla. Owing to the impossibility of seeing over the sand-dunes that fringed the coast, the flotilla depended upon wireless telegraphy for information as to the best available targets, as to the accuracy and efficiency of the fire, as to the general military situation, and even as to the positions of enemy guns which were engaging the ships.

During the day various reports of the presence of enemy submarines were received ; a sharp look-out was kept and a patrol of the North East Channel was instituted.

On this day Nieuport Pier was destroyed by shell-fire, and after this date no communication by boat to Nieuport was possible, although the beach to the westward was always available.

As the monitors soon ran out of ammunition, and as it appeared likely that they would fire their entire ammunition outfit every day, arrangements were made to work up a big supply of ammunition at Dunkirk for all classes of guns represented in the Flotilla. When this was done, the Flotilla was self-contained, and ships were only

obliged to return to England if heavily damaged. Of an evening the ships that required coal, oil, and ammunition returned to Dunkirk, while the rest remained at anchor in the West Deep, protected by the usual night patrol.

During the night of the 19th, heavy firing continued on shore, but when day broke on October 20th, the situation appeared unchanged. During the forenoon two large French destroyers, the *Intrepide* and *Aventurier*, arrived to co-operate, bringing messages from Vice-Admiral Favereau, and from this date onwards not less than four or five French destroyers were always available and worked in combination with the British flotilla.

During the day the situation on shore was very critical ; soon after 10 o'clock in the forenoon, a determined attack was made by the enemy on Westende, and all available vessels concentrated their fire on the approaches to the village from the eastward. About noon a signal was received from the shore that the situation was grave, and that a heavy fire should be opened on the Blockhouse Farm and the approaches to Westende Bains.

All naval guns were already in action, but it was decided to make a demonstration in force, and the entire Flotilla, headed by the *Amazon* flying the Flag, followed by the sloops *Wildfire*, *Vestal*, and *Rinaldo*, proceeded close past Westende Bains, all ships firing at their highest possible rate. At the same time the monitors, stationed in shoal water off Middelkerke, continued their fire at the German positions without ceasing.

It cannot be doubted that this naval demonstration bore good fruit ; the volume of fire of the naval guns was very great, and the targets were so close at hand that all guns were able to give effective assistance.

The enemy kept up a very heavy fire from the shore on the ships ; many ships were hit, including the *Amazon*, which received a shell on the water-line which made a hole eight feet square, and necessitated her return to a dockyard. Owing to the serious damage in the *Amazon*, the Flag was shifted to the *Cossack*, the former proceeding to the dockyard for repair.

As darkness fell, the firing from the ships gradually died away, and the only ships available for use were the destroyers detailed for night patrol duties, as all the other ships had completely exhausted their ammunition.

In the meanwhile, orders were sent for the *Foresight* and *Hazard*, as well as for the gunboats *Bustard* and *Excellent*, to repair to the scene of operations.

Trafalgar Day proved to be one of the most important days of the Belgian coast operations. It was arranged to commence firing at dawn and to continue all day directing the fire, not so much at the enemy's guns, as to cover the area in which German troops were operating, enfilading their trenches, and covering the ground over which the enemy must advance.

The *Foresight* took up a good position off Westende; from the fore-top a fairly good view was obtained of the Belgian shell bursting over the German trenches, and of the flashes of the German guns replying. Communication was kept up all day with the Belgian Headquarters, at 8.30 a.m. an encouraging signal being received that the naval fire was most accurate. Later on, further reports of enemy batteries and objects for fire were received. Suitable orders were at once given, and during the whole day the firing from destroyers, the *Foresight*, the *Hazard*, the sloops and gunboats continued without intermission. The *Foresight* alone fired 1,350 rounds from her 4-inch guns.

During the day reports of enemy submarines were again received and careful search was made without result. In the evening a message of thanks was received from Headquarters for the efficient assistance which had been given. All the reports from prisoners stated that the naval fire was very severe and that its effect was great.

The early morning of October 22nd was thick and misty. All the ships proceeded early to the firing-ground, where the situation appeared to be less critical. Heavy firing was kept up during the day on the enemy positions, but the thick mist prevented accurate observation, and the firing ceased before dark, the ships returning to anchor for the night.

On October 23rd, at early dawn, bombardment of the German positions re-commenced.

The sloop *Wildfire* reported that two torpedoes from a submarine were fired at her; all available torpedo craft swept over the surrounding water without result.

It was decided to examine Ostend, so at about 11 a.m. the *Crusader*, flying the Flag, proceeded at high speed past Middelkerke and Mariakerke and close off Ostend, rounding the quay just off the entrance to the harbour.

A good deal of excitement was observable on the sea front ; people were running about and great exertions were being made with horses to drag guns into position. The *Crusader* reduced speed on rounding the buoy and obtained a good view into the harbour, where no craft were visible. Fire was opened from the shore, which was immediately responded to ; the second shot from the *Crusader* went into the Hotel Majestic, where, so it was afterwards heard, the German Staff were at lunch.

It did not appear desirable to bombard Ostend, partly because it was believed to be crowded with civilians, but chiefly because it was hoped it would soon be in occupation of the Allies.

The weather was very bad during the night of October 25th, and in the early morning the monitors remained under shelter.

Reports from Headquarters showed that the situation was quiet, but that an attack was expected. Later on in the forenoon, it was reported that the Germans had occupied Westende and Westende Bains, as well as Mannenskevere and the river line in that vicinity. It was further notified that the situation was very critical, and that it was possible that Furnes would have to be evacuated. In these circumstances, the ships were in action with all their guns until dark, in response to urgent requests from the shore, and firing only ceased when all ammunition had been expended.

The enemy were in possession of Lombardsyde, Westende and Westende Bains ; but the Belgians held on firmly at Nieuport and on the line from Nieuport to Dixmude.

Late at night it was reported that the situation had slightly improved. The battle-ship *Venerable* arrived during the night, and at 6 a.m. the Flag was transferred and firing commenced from her, as well as from the *Sirius*, *Brilliant*, three monitors, several sloops, gun-boats, and destroyers.

Day by day more and heavier guns were being mounted among the sand-dunes ; they were invariably well placed, were invisible from the ships, and in some cases could not be reached at all by the naval low trajectory shell.

Positions were given from the Admiralty of two very large guns near Middelkerke, and of six 20-centimetre guns near Manakerke ; these were constantly in action with the fleet, as well as some heavy guns near Slype and others near Bamburgh Farm, the latter being moved about as the occasion demanded.

By the evening the situation had decidedly improved ; the enemy had made no further gains and every day's delay in their advance was of inestimable value for the bringing up of the reinforcements that were on their way.

October 28th was a very busy and important day so far as the British Flotilla was concerned. The great battle of Ypres-Armentières was at its height, and naturally the effect was felt right up the coast. Admiral Hood proceeded early in the *Venerable*, and firing commenced from all available ships, and continued against increasing opposition all day. The presence of the battle-ship *Venerable* necessitated a specially careful anti-submarine patrol ; it was absolutely necessary to keep a destroyer in the North-East Channel, and while carrying out this duty the destroyer *Falcon* received a large shell which burst on one of the guns in the waist, and killed eight men, including the captain, wounding sixteen others ; her steering-gear was damaged, and she received severe structural injury, which necessitated her return to Dunkirk and thence to Dover.

Most of the ships received damage during the day ; the turret of the *Mersey* was put out of action, and she was damaged on the water-line ; the *Brilliant* had one man killed and seven wounded, and received injury at the water-line. Late in the afternoon the *Wildfire* reported extensive damage on the water-line, and hauled off for repairs.

A heavy fire was kept up throughout the day on the German positions, particularly on Lombardsyde and Westende, which were easily reached by all guns ; also on Ratteville, Slype, and Bamburgh Farm, which were reached by the heavier guns.

The situation on October 29th was much the same as on the preceding day. The enemy kept up a heavy bombardment both on the ships and on the Franco-Belgian lines. In the afternoon a strong German attack developed on Pervise, and all the big guns of the fleet were brought into action.

The weather was very thick, and it was difficult to make out the objects on shore ; but, in response to an urgent request late in the afternoon, fire was again opened on Lombardsyde and Westende.

Shortly after midnight a special attack by the monitors was made on the heavy guns off Middelkerke. It is very hard to say how useful it was, it being almost impossible for the gunlayers to know where their shots were going. The night was very dark, the ships were able to fix their positions, and to approach close to the enemy batteries ;

but the laying of the guns was almost impossible, as there was absolutely nothing to lay them on.

All available ships were at the rendezvous early on October 30th. Admiral Hood proceeded to the French destroyer *Intrépide* and hoisted his flag there, and, in company with *L'Aventurier*, proceeded to engage the German positions at Lombardsyde; at the same time the British ships opened fire at Westende, Westende Bains, and Slype.

The news from the shore showed that bombardment went on the whole night at Pervise, and that at dawn a heavy attack began at Ramscapelle. It was difficult to reach this place with the guns of the fleet, but fire was opened on the line St. George-Schoorbakke, though the range was decidedly long, and it was quite impossible to get any idea of the efficiency of the fire.

On November 1st firing from the fleet was kept up all day against a good deal of opposition; a few casualties occurred, chiefly in the sloop *Vestal*.

The reports of prisoners showed that the firing of the flotilla was very effective, and greatly feared by the enemy.

Day by day heavier guns were mounted among the dunes from Westende to Ostend and beyond; reports constantly came in of the size and position of these guns, which included at least three of 42 centimetres, a few of 30 centimetres, and a great number of 21 centimetres, the last named being moved about from place to place. There were, in addition, a great number of smaller guns of good range, varying from 5-inch to 12-pounder or thereabouts.

On November 2nd the usual bombardment from the ships commenced early. The enemy responded, but as usual it was impossible to locate the position of the shore guns. The inundation of the surrounding country, which had been gradually gaining ground, began to have important effects, and this, combined with a vigorous offensive, caused the Germans to fall back to Pierie Capelle. It had begun to become apparent that the rush of the Germans along the coast had been checked. The mounting of such a number of heavy guns among the dunes pointed to a defensive rather than an offensive policy on their part, and for the present the work of the flotilla was almost at an end.

As there appeared very little chance of an advance of the Allies, it was decided to lay mines so to deny the North-East Channel to the enemy; this was done by French mine-layers during the night.

On November 3rd Admiral Favereau, commanding the Light

Squadron, visited the *Crusader* and proceeded to Nieuport Roads to inspect the scene ; everything was quiet.

On the British force returning to Dunkirk, information was received that the German Fleet had been sighted off Yarmouth. All destroyers were ordered to Dover, and on arrival there Admiral Hood proceeded to the *Attentive* to obtain the latest information.

During the night of the 4th information was received that the Germans had occupied Lombardsyde during the night, and it was requested that that place should be bombarded at dawn. This was done by the *Crusader*, *Bustard*, and *Excellent*. The weather was at intervals very foggy, but reports from the shore showed that the fire was effective.

A signal was received from the shore about 1 p.m. that no more firing was required, and the flotilla returned to anchor, and prepared for the next day's work.

Before daylight on November 7th it was reported that the French intended to advance along the coast, and it was requested that the flotilla should guard the left flank. All available ships were at their stations, and the bombardment of Lombardsyde, Westende, and Westende Bains was carried out by the *Excellent*, *Bustard*, *Rinaldo*, *Humber*, and destroyers. The next day orders were received that all the vessels were to return to England.

This concluded the operations which commenced early in October with a rush of the Germans along the coast, coinciding with the violent attacks farther up the line that formed the great battle of Ypres-Armentières.

APPENDIX II

SALVAGE AND OTHER SERVICE RENDERED TO VESSELS BY CAPTAIN JOHN IRON AND THE DOVER SALVAGE TUGS

SALVAGE SERVICES, ETC., RENDERED TO ADMIRALTY VESSELS DURING THE YEARS 1916-17

Date.	Vessel.	Remarks.
1916		
Oct. 17-26 } Nov. 2-9 }	H.M. Tug Herculanum	Sunk in Dover harbour. Placed wires under her ready for lifting.
Oct. 19 .	s.s. Alaunia	
" 27-31	H.M.S. Nubian	Torpedoed and driven on rocks under South Foreland. Steam blown off at No. 2 boiler room Arranged for R. Engines to blast a cutting through the rocks from Nubian to sea and made arrangements for floating vessel. Afterwards work was taken in hand by Salvage Officer from the Salvage Section, who continued the work on the same lines and succeeded in floating vessel.
Oct. 30-1 .	s.s. Mantola	Mined Towed from Sunk Light Vessel to Gravesend.
Nov. 4-9 .	s.s. San Urbano	Mined. Took her from Dungeness to Thames.
" 11 .	s.s. Lucerio	Stranded Dungeness. Refloated her.
Dec. 14-16	s.s. Rovington	Stranded at Walddam (Calais). Refloated her.
" 23 .	s.s. Aldershot	Stranded on Goodwins. Refloated her.
1917		
Jan. 2-3 .	s.s. Sussex	Mined. Grounded on S.W. Ruytingen. Steamer had no steam. Floated her at 7 p.m. during a W.S.W. gale She was drawing 40 ft. forward and 20 ft. aft. Succeeded in beaching her off Gravelines at 11 p.m., and refloating her on the a.m. tide, and towing her stern first with one tug to Dunkirk, arriving about 7 a.m.
" 25 .	s.s. Tanta	Stranded Goodwins. Refloated her.
Mar. 2 .	s.s. Brooklet	Stranded under Abbot's Cliff. Refloated her.

Date.	Vessel.	Remarks.
¹⁹¹⁷ Mar. 13 .	H.M.S. Meteor	Mined. Succeeded in getting her to Dover.
" 18 .	T.B. Llewellyn	Torpedoed in action. Left in <i>Lady Brassey</i> without lights on account of German submarine and found <i>Llewellyn</i> in the dark, S.E., twelve miles from Dover. Succeeded in getting her to Dover.
" 23 .	s.s. Mexico	Mined. Took her from Beachy Head to London.
May 12-17	Admiralty Transport Waterville	Mined. Aground on Brake sand with twenty degrees of list. Floated her off in a sinking condition and beached her at Sandown Castle to prevent sinking. Then temporarily repaired and refloated her and took her to London stern first.
" 29 .	H.M.S. Matchless	Gradually sinking after collision. Succeeded in towing her in and beaching her in the harbour. She was wedged up by my suggestion by the dockyard, refloated next high water, and placed on floating dock.
" 30-31	H.M.S. Mastiff	Ashore at Shakespeare Cliff. Refloated her.
June 14-15	Transport Basi	Ashore at Le Touquet with 3,400 tons ammunition. Proceeded to her and found her in dense fog. Her bulwarks at after part of bridge had already broken by lying over one low tide. Succeeded in refloating her and taking her into Boulogne.
" 24 .	Transport Erato	Collision and making water. Took her to Prince of Wales' Pier and temporarily repaired her.
July 1 .	H.M.S. Cossack	Explosion by depth-charge after collision. Stern blown off to water. Towed her to Dover.
" 27 .	H.M.A.T. Cambrian	Stranded on N. Goodwin. Refloated her.
Aug. 8 .	H.M. Transport Calonne	Stranded at Dungeness. Refloated her.
" 16 .	s.s. Stamboul	Stranded on Galloper. Refloated her.
" 29 .	Bk. Eupica	Drifting into mine-field. Went into the mine-field after her and succeeded in bringing her out clear.
Sept. 19-22	s.s. Servian	Ashore at Cap Grisnez. After discharging 5,000 tons, refloated her at high water 21st, and towed her to Downs, putting tugs alongside pumping. On 22nd towed steamer to Thames Haven.
Oct. 14 .	s.s. Brier Rose	Stranded at Boulogne. Refloated her.
Nov. 3 .	s.s. Duke of Cornwall	Broken down. Took her from Boulogne to Grisnez.
" 24 .	s.s. Relentless	In mine-field. Went in to her with <i>Lady Crundall</i> , and succeeded in bringing her out.

SALVAGE AND OTHER SERVICES

621

Date.	Vessel.	Remarks.
1917 Nov. 24-27	German submarine U.48	Stranded on Goodwins with ends blown off. Boarded vessel in Deal lifeboat and succeeded in getting some of her papers.
" 5	H.M. Tug Britannia	Stranded and holed at Dungeness. Proceeded to her from <i>Terror</i> , and, after working at her for eleven days in getting her down the beach and stopping leaks, succeeded in floating her and bringing her to Dover.
" 15	s.s. Petra	Stranded on Goodwins. Floated her off during S.W. gale.
Dec. 7	H.M.S. Hornet	In collision. Towed to Dover stern first.
" 17	s.s. Roma	Stranded at Deal, above high-water mark. Put her on ways and dug down beach and launched her broadside on.
1918 Jan. 15	A. Transport Pollensa	Ashore at Galloways. Top of high-water mark, spring tides. Discharged 2,500 tons of coal and dug steamer down the beach and succeeded in floating her at high water and steamed her to Dover.

SALVAGE SERVICES, ETC., RENDERED TO VESSELS DURING THE
YEARS 1915, 1916, and 1917

Date.	Vessel.	Tonnage.	Remarks.
1915 Aug. 3-4	Galicia	5,922	Mined. Beached, temporarily repaired, and refloated her.
Sept. 13	Italian Tug No. 2		Collision damage. Beached and temporarily repaired.
Nov. 22	s.s. Theban		Cargo (maize) heated. Got heated cargo on deck and cooled it.
" 23	3-mst. sch. Laurits		Collision damage. Temporarily repaired.
" 25	s.s. Assimacos		Mined. Stranded Deal beach. Temporarily repaired and refloated her.
Dec. 6	Barge Rakel		Ashore Shakespeare Cliff. Refloated her.
" 7	s.s. Princess Sophia	2,282	Collision damage. Temporary repairs effected.
1916 Jan. 29	s.s. Pontopores	2,603	do. do.
Feb. 2	s.s. Andoni	2,034	do. do.
Mar. 2	s.s. Tenersborg	577	do. do.
" 7	s.s. Swiftsure	487	do. do.

Date.	Vesse.	Tonnage.	Remarks.
1916			
Mar. 25 .	s.s. Elizabeth Maersk	1,144	Collision damage. Temporary repairs effected.
" 27 .	s.s. Turret Chief	450	do. do.
	s.v. Bayonne	2,241	do. do.
April 13 .	s.s. Chatton	3,221	Collision. Temporarily repaired her.
" 13 .	s.s. Leicestershire	5,043	Collision. Brought into Admiralty Harbour and temporarily repaired.
May 15 .	s.s. Glencoe	1,648	Collision. Temporarily repaired her.
" 15 .	s.s. Strathcona	1,465	do do.
June 20 .	s.s. Douro	485	do do.
" 29 .	s.s. Candia		Grounded under South Foreland to prevent sinking after collision. Jettisoned about 1,000 tons iron ore. Refloated and re-beached her at Sandown Castle. Temporarily repaired her and refloated.
Aug. 1 .	s.s. Jessie	1,445	Collision. Beached. Temporarily repaired and refloated her.
	s.s. Zaanaland	3,526	Collision damage. Temporarily repaired her.
" 2 .	s.s. Llanthony Abbey	1,528	Collision. Temporarily repaired.
" 3 .	s.s. Adolphe Urban	233	do do.
" 7 .	s.s. Phœda	1,653	Collision damage. Temporarily repaired her.
" 12 .	s.s. Driebergen	1,185	Collision damage. Temporarily repaired her.
	s.s. Wegasdeck	2,387	do do.
" 15 .	H.M.T. Electra II		do do.
	H.M.T. St. Germain		Beached at Dungeness to prevent sinking after collision. Vessel submerged at high water. Shielded wound, pumped out and refloated her and brought her to Dover under her own steam.
Sept. 4 .	s.s. Suram	2,338	Collision. Temporarily repaired her.
	s.s. Kathleen Lily	317	do do.
	s.s. Tenbergen	2,458	do do.
" 11 .	s.s. Houstantic	2,922	Stranded and refloated.
" 12 .	s.s. Farsum	1,597	Collision damage. Temporarily repaired her.
" 15 .	s.s. Clermiston	803	do do.
" 16 .	s.s. Port Haching	4,025	do do.
Oct. 7 .	s.s. Britta	1,291	do do.
" 10 .	s.s. Ubia	1,779	do do.
" 13 .	s.s. Fairmuir	259	do do.
" 14 .	s.s. Rosenborg	1,210	do do.
" 31 .	s.s. Westmeath		On fire in Downs. Extinguished fire.
Nov. 3 .	s.s. Rayford	186	Collision damage. Temporarily repaired her.
	s.s. Stenimachos	1,175	do do.

Date.	Vessel.	Tonnage.	Remarks.
1916			
Nov. 13 .	s.s. Hero	1,598	Stranded at Kingsdown. Re-floated her.
„ 24 .	s.s. Elizabeth	905	Collision damage. Temporarily repaired her.
„ 23 .	Angelic Maersk		Beached at Sandgate to prevent sinking after collision. Badly cut on port side. Shielded wound as tide fell and filled in with concrete and floated her the next high water.
„ 25 .	Cable s.s. Telconia		Collision damage. Temporarily repaired her.
„ 29 .	s.s. Loughbrow	420	Collision damage. Temporarily repaired her.
Dec. 1 .	s.s. Petra	1,636	Stranded on Goodwins. Refloated her.
	s.s. Glenbrook	113	Collision damage. Temporarily repaired her.
„ 23 .	s.s. Gordonia	2,461	do. do.
	s.s. Zamia	1,311	do. do.
	s.s. Heraklias	2,116	do. do.
„ 28 .	s.s. Brunswijk	1,350	do. do.
„ 29 .	s.s. Kingswood	1,205	Collision damage. Temporarily repaired her.
	s.s. Heraklias	1,840	do. do.
„ 30 .	Clan McDonald		Damaged and strained by bad weather while crossing the Atlantic. Proceeded to Dunkirk convoyed by tug.
1917			
Jan. 9 .	s.s. Webburn	417	Collision damage. Temporarily repaired her.
„ 25 .	s.s. Juno	1,385	Mined. Sent to Rotterdam convoyed by Dutch tug.
„ 30 .	s.s. Hazelpark	1,785	Collision. Temporarily repaired her.
	s.s. Portreath	1,947	do. do.
Feb. 12 .	s.s. Eli Linave	639	do. do.
„ 23 .	s.s. Kronprins Olaf	685	do. do.
„ 24 .	s.s. Ethelwyne	2,067	Beached to prevent sinking after collision. Temporarily repaired and refloated her.
„ 26 .	s.s. Marie Thérèse	837	Collision. Temporarily repaired her.
„ 27 .	s.s. O. A. Knudsen	2,266	do. do.
Mar. 19 .	Armed S.Y. Simoun	308	Collision damage. Temporary repairs effected.
„ 21 .	s.s. Taxfleet	419	do. do.
April 23 .	s.s. City of Frankfort	520	Collision damage. Temporarily repaired her.
	T.B. 24		Sunk at South Pier. Slung her with mooring lighter and two hopper barges and carried her on to west bank in Tidal Harbour and handed her over to dockyard.

Date.	Vessel.	Tonnage.	Remarks.
1917			
May 9 .	s.s. Whitecourt	2,391	Collision damage. Temporarily repaired her.
„ 22 .	s.s. Birchgrove	1,795	Attacked by German sea-planes. No serious damage.
June 24 .	s.s. Erato	1,133	Collision damage. Temporarily repaired her.
July 5 .	s.s. Suram	2,338	Collided with breakwater. Temporarily repaired her.
„ 18 .	s.s. Suram	2,338	Sub-collision damage. Again temporarily repaired her.
„ 24 .	H.M. Tug Hero	85	Collision damage. Temporarily repaired her.
„ 30 .	s.s. Spurn Point	87	do. do.
Aug. 16 .	s.s. Stamboul	1,592	Stranded on Goodwins. Refloated her.
Oct. 13 .	H.M.S. Terror		Torpedoed and stranded north of Dunkirk. Floated her into Dunkirk Harbour. Temporarily repaired her and brought her to Dover floating on the lower messdeck. Subsequently towed her to Portsmouth stern first.
Dec. 10 .	s.s. Alt		Collision damage. Temporarily repaired her.
„ 29 .	H.M. Trawler Strathcairn		do. do.
July 19 .	St. Germain		Sunk at Folkestone after collision. Lifted her by means of mooring lighter, hoppers and pumps, bows being completely off—bulk-headed across first hold and towed her to Dover and subsequently to London.

APPENDIX III DESTROYERS AND TORPEDO BOATS OF THE ORIGINAL SIXTH FLOTILLA

VESSELS IN THE DOVER PATROL DURING 1915, 1916, AND 1917

Ship.	Joined Flotilla.	Left Flotilla.	Rank and Name of Commanding Officer.	Date of Appoint- ment.	Date of leaving Ship.	Remarks
Nubian .	Aug. 1914	28.11.16	Comdr. C. E. Cundall Lt. Wm. O. Hozier Lt. J. Hallett	20.1.15 23.6.15 22.3.16	20.1.15 23.6.15 19.1.16	
Saracen .	Aug. 1914		Comdr. M. R. Bernard Lt.-Comdr. M. R. Bernard Comdr. V. L. A. Campbell	6.1.15 21.6.16 16.3.17	16.3.17 30.11.17 13.7.18	
Tartar .	Aug. 1914	24.6.17	Lt. J. T. Creery Hill Lt. Geo. E. L. Atwood Lt. N. K. W. Barttelot Lt.-Comdr. R. H. B. Hammond Chambers Lt.-Comdr. W. H. Sandford Lt.-Comdr. G. K. Twiss	30.11.17 3.2.14 20.4.15 6.4.17 4.6.17	6.4.17 24.6.17	Killed in mine explosion.
Viking .	Aug. 1914		Lt. B. H. Hopkinson Lt. H. Adair Hall Comdr. E. R. G. R. Evans Lt. J. N. Gilbertson Comdr. F. C. H. Williams	1.11.17 29.11.14 1.12.14 24.12.15 29.12.15	29.12.15	Killed in mine explosion.
			Comdr. H. G. L. Oliphant Lt. John Brooke Lt. L. H. K. Hamilton	Oct. 1916 27.11.16 12.9.17	27.11.16 12.7.17 5.3.18	
Zubian .	2.7.17		Lt. H. J. Hartnoll Lt. G. F. Hannay	20.6.17 30.5.18	29.5.18	
Zulu .	Aug. 1914	23.11.16	Lt.-Comdr. W. S. Castle Lt.-Comdr. L. D'O. Bignell Lt. John Brooke	2.9.14 6.9.14 6.11.15	16.9.15 23.11.16 21.7.15	
Afridi .	Aug. 1914		Lt. Edmond A. B. Stanley Lt. Hugh R. Troup Lt. P. R. P. Percival Lt. F. T. Hare Lt. C. J. L. Hill	Apr. 1914 21.7.15 8.12.15 Mar. 1917 26.12.17	21.7.15 24.1.17 26.12.17	
Amazon .	Aug. 1914		Comdr. H. G. L. Oliphant Lt. G. L. Warren Lt. A. Ferguson Lt. J. C. Colvill	1.5.14 19.9.16 20.7.17 29.3.18	19.9.16 21.6.17	
Cossack .	Aug. 1914		Lt. G. C. Harrison Lt. W. E. Magee Lt.-Comdr. (Retd.) P. J. Heiyar Lt.-Comdr. H. E. Gore Langton Lt. A. Ferguson Lt.-Comdr. Aubrey E. D. Moore	3.2.14 28.6.15 8.2.16 11.2.17 6.7.17 Mar. 1918	28.6.15 8.12.15 11.2.17 6.7.17 20.7.17	

Ship.	Joined Flotilla.	Left Flotilla.	Rank and Name of Commanding Officer.	Date of Appointment.	Date of leaving ship.	Remarks.
Crusader .	Aug. 1914		Comdr. J. H. Woodbridge Lt.-Comdr. G. L. D. Gibbs Lt.-Comdr. T. K. Maxwell Comdr. R. H. Coppinger Comdr. F. C. H. Williams Comdr. E. R. G. R. Evans Comdr. E. L. Cardale Lt. J. R. Johnson Lt. J. C. Colvill Lt.-Comdr. R. W. Richardson Lt. H. T. Baillie-Grohman Lt. H. C. Woolcombe- Boyce	3.12.13 July 1914 27.4.15 15.6.15 10.8.15 29.12.15 11.11.16 3.5.17 11.1.18	27.4.15 15.6.15 Aug. 1915 28.12.15 11.11.16 16.3.17 11.1.18	
Ghurka .	Aug. 1914	Sunk, 8.2.17		26.7.15 6.3.16	26.7.15 14.2.16	
Maori .	Aug. 1914	Sunk, 1915	Comdr. B. W. Barrow			Taken prisoner.
Mohawk .	Aug. 1914	3.10.17	Lt. B. L. Owen Lt. R. W. Bayly Lt. H. D. Adair Hall Lt.-Comdr. H. S. Bradyll Lt. H. B. Wrey	3.2.14 18.2.14 3.12.14 14.7.16 31.1.17	23.6.15 31.1.17	
Crane .	Aug. 1914	5.3.18	Comdr. R. H. Coppinger Lt. A. K. Gibson Lt. P. N. Fletcher, R.N.R.	2.2.14 15.6.15 6.4.16	15.6.15	
Falcon .	Aug. 1914	13.2.18	Lt. H. O. Wanton Lt. A. C. N. Farquhar Lt. R. G. Glazebrook Lt. C. H. Lightoller, R.N.R.	29.10.12 4.8.15 26.4.16 26.7.16	8.4.16	Killed in action.
Fawn .	Aug. 1914	5.3.18	Lt. H. C. Woolcombe- Boyce Lt. G. M. Gilbertson Lt. H. C. Woolcombe- Boyce Lt. F. R. M. Johnson Lt. J. Willetts, R.N.R.	June 1914 9.4.15 20.4.15 6.3.16 1.8.16	9.4.15 20.4.15 6.3.16 31.7.16	
Flirt .	Aug. 1914	Sunk, 26.10.16	Lt. H. S. Braddyll Lt. A. N. Swainson Lt. R. P. Kellett	2.2.14 14.9.15 5.6.16	14.9.15	
Gipsy .	Aug. 1914	24.11.18	Lt. E. W. Bowly Lt. W. W. Skynner Lt. I. Creery Hill Lt. F. W. Robinson, R.N.R.	14.4.14 9.4.15 9.1.16 16.3.17	1.2.15 17.1.16 16.3.17	Killed in action.
Greyhound	Aug. 1914	29.3.18	Lt.-Comdr. W. E. Castle Lt. E. V. Pender Lt. F. J. Peters Lt. R. G. Glazebrook Lt. A. P. Melsom, R.N.R. Lt. W. Devlin, R.N.R.	6.9.14 10.2.15 22.11.15 7.9.16 14.10.16 10.3.17	14.1.15 5.10.15	
Kangaroo	Aug. 1914	24.11.18	Lt. H. Forrester Lt. D. Mansfield, R.N.R.	6.1.15 26.4.16	2.12.15	
Leven .	Aug. 1914	24.11.18	Lt. W. J. Dunlop Lt. C. S. Thomson Lt. H. Forrester Lt. F. E. Ayers Lt. A. H. D. Young, R.N.R. Lt. A. P. Melsom, R.N.R.	20.1.14 9.8.15 2.12.15 13.6.16 7.1.17 6.2.17	9.8.15 26.9.15 3.11.16	
Mermaid .	Aug. 1914	1.7.18	Lt. P. R. P. Percival Lt. D. O. Fildes Lt. G. Hannay Lt. A. Pawley, R.N.R. Lt.-Comdr. R. H. B. Hammond Chambers Lt. G. N. Gilbertson	21.4.14 19.3.16 24.3.17 12.12.17	8.12.15 24.3.17 11.12.17	
Myrmidon	Aug. 1914	Sunk, 26.3.17		9.10.14 20.4.15	20.4.15 17.3.16	

DESTROYERS AND TORPEDO BOATS

627

Ship.	Joined Flotilla.	Left Flotilla.	Rank and Name of Commanding Officer.	Date of Appoint- ment.	Date of leaving ship.	Remarks.
Myrmidon	Aug. 1914	Sunk 26.3.17	Lt. A. K. Gibson	17.3.16	17.8.16	
Racehorse	Aug. 1914	24.11.18	Lt. O. J. P. Lee, R.N.R. Lt. E. P. Broad Lt. W. O. H. Lambert Lt. G. L. Warren Lt. H. Welch, R.N.R. Comdr. F. C. H. Williams	17.8.16 20.2.12 16.2.15 24.3.15 4.10.16	27.3.15 19.9.16	
Syren	Aug. 1914	24.11.18	Comdr. E. L. Cardale Lt. Baker Comdr. W. K. Irvin Lt. A. Ferguson Lt. C. Halliday Lt.-Comdr. H. B. L. Scrivener	10.8.15 11.11.16 15.11.16 29.1.17 16.7.17	10.8.15 11.11.16 15.11.16 20.1.17 16.7.17	
Uie	Aug. 1914	28.11.16	Lt. E. S. Graham Lt. F. R. M. Johnson	14.11.15 5.12.16	14.11.15 17.2.16 20.6.17	
Panther	25.3.18	3.11.18	Lt. H. S. Laidlaw, R.N.R.	19.3.18		
Violet	25.3.18	14.11.18	Lt. A. W. Knight, R.N.R. Lt. G. S. Holden Lt. H. P. Boxer Lt. R. E. M. Harris Lt. F. R. M. Johnson Lt. D. S. McGrath Lt. C. J. H. Hill Lt. D. N. Tuinell	24.11.17 1.5.12 17.1.16 31.7.16 31.1.17 25.8.17 26.12.17	17.1.16 31.7.16 5.12.16 26.12.17	
T.B. 13			Lt.-Comdr. C. R. Hemans Lt.-Comdr. F. G. Schurr Lt. R. E. Hollings Lt.-Comdr. F. E. G. Hobart Lt. E. N. Mortimer Lt. K. R. Farquharson Lt. M. P. C. Kerr Lt. W. C. Johnson	19.2.15 3.3.15 11.5.15 19.2.15 Mar 1915 5.4.15 1.9.16 30.11.17	3.3.15 11.5.15 15.4.15 2.9.16 30.11.17	
T.B. 15						
T.B. 24		Sunk, 28.1.17	Lt. H. B. Wrey Lt. C. M. Campbell	24.11.16	24.11.16	

APPENDIX IV

DESTROYERS, P-BOATS AND M-MONITORS WHICH JOINED THE SIXTH FLOTILLA AND CRUISERS ATTACHED TO THE PATROL

VESSELS IN DOVER PATROL IN 1915, 1916, AND 1917.

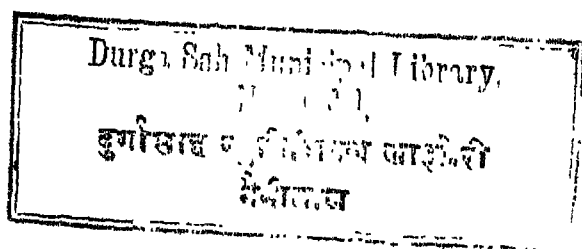
Ship.	Joined Flotilla.	Left Flotilla.	Rank and Name of Commanding Officer.	Date of Appoint- ment.	Date of leaving Ship.	Remarks.
Attentive .	1914	25.4.18	Capt. C. D. Johnson	Mar. 1917		
Active .	25.12.16	Nov. 1917	Comdr. N. W. Diggle	25.12.16		
			Comdr. K. Kiddle	Mar. 1917	2.11.17	
Adventure	1914	1915	Capt. G. C. Campbell	2.11.17		
Foresight .	1914	1915	Comdr. E. O. Gladstone			
Sentinel .	1914	1915	Comdr. H. N. Garnett			
Phoenix .	30.10.16	24.2.17	Lt.-Comdr. Wright		2.11.16	
			Lt. C. Petrie	2.11.16		
Lapwing .	30.10.16	8.3.17	Lt. Griffith		10.11.16	
			Lt. L. S. M. Adam	10.11.16		
Porpoise .	21.11.16	8.3.17	Comdr. G. P. Leith	May 1916		
Paragon .	21.11.16	Sunk, 17.3.17	Lt. A. T. N. Abbay		22.11.16	
			Lt. R. G. Bowyer	22.11.16		Killed in action.
Victor .	2.12.16	8.3.17	Lt. C. M. Graham			
Unity .	2.12.16	4.3.17	Lt.-Comdr. A. D. C. Cooper			
			Key			
Ambuscade	21.11.16	4.4.17	Lt. R. Nash	11.10.16		
Martin .	27.11.16	1.12.16	Comdr. R. L'E. M. Rede	30.9.16		
Hope .	27.11.16	3.12.16	Lt.-Comdr. F. G. Foote	25.10.16		
Swift .	end of 1915	25.11.18	Comdr. R. H. Coppinger	Aug. 1915	6.7.16	
			Comdr. A. M. Peck	29.9.16	1.10.17	
Broke .	7.12.16		Comdr. Regd. Amedroz	1.10.17		
			Comdr. E. R. G. R. Evans	7.12.16		
Faulknor .	31.12.16	19.9.18	Comdr. B. H. Ramsay	25.10.17		
Marksman	26.8.17	22.3.18	Comdr. H. C. L. Oliphant	29.11.16		
Kempenfelt	15.9.17	2.4.18	Comdr. V. L. A. Campbell	11.12.17		
Botha .	4.5.17	23.10.18	Comdr. R. St. P. Parry			
			Comdr. G. R. L. Edwards	Apr. 1917	20.12.17	
Termagant	17.11.17		Comdr. L'E. M. Rede	20.12.17		
Trident .	23.11.17		Comdr. M. R. Bernard	6.11.17		
			Comdr. C. W. E. Trelawney	29.9.17		
			Comdr. R. L'E. M. Rede	20.12.17		
			Act. Lt.-Comdr. G. M. Cameron	21.12.17		
			Act. Comdr. R. Hammond Chambers	26.12.17		
Manly .	8.5.17		Comdr. R. H. B. Hammond Chambers	6.4.17	26.12.17	
			Lt. F. T. Hare	26.12.17		

DESTROYERS, P-BOATS, AND M-MONITORS

629

Ship.	Joined Fleet.	Left Fleet.	Rank and Name of Commanding Officer	Date of Appoint- ment.	Date of leaving ship.	Remarks.
Mansfield .	31.5.17		Comdr. A. F. W. Howard	24.11.14		
Matchless .	9.4.17		Lt.-Comdr. W. H. Sandford	8.7.17		
Mastiff .	5.3.17		Lt.-Comdr. A. D. C. Cooper			
			Key	Mar. 1917		
			Lt. C. A. G. Hutchinson	18.1.17		
			Comdr. W. D. Irvin	20.6.17		
			Lt.-Comdr. J. Brooke	12.7.17		
			Lt.-Comdr. G. C. H. Lawson	26.12.17		
Melpomene	1.3.17		Lt. D. H. Rainier	18.1.17		
			Lt. C. H. Ringrose	9.4.18		
Mentor .	18.2.17		Lt.-Comdr. A. J. Landon	22.1.17		
Melcor .	24.2.17		Comdr. W. D. Irvin	20.1.17		
			Lt.-Comdr. H. Forrester	May 1917		
Milne .	30.4.17		Comdr. V. L. A. Campbell	16.3.17	11.12.17	
			Lt. Jack F. Hoffman	11.12.17		
Minos .	26.5.17	10.1.18	Comdr. C. T. A. Bunbury	3.5.17		
Miranda .	1.4.17	23.10.18	Lt. Christopher H. Petrie	Mar. 1917		
Moorsom .	24.3.17		Lt.-Comdr. H. S. Bradyll	31.1.17		
Morris .	1.3.17		Lt.-Comdr. F. R. P. Percival	24.1.17		
Murray .	5.6.17		Comdr. H. T. Dorling	3.11.14		
			Comdr. M. R. Bernard	6.11.17		
			Lt. H. B. Wrey	6.11.17		
			Lt. F. G. H. Dalrymple			
			Hamilton	1.3.18		
Myngs .	5.3.17		Lt.-Comdr. P. J. Helyar	11.2.17		
North Star	30.5.17	Sunk, 23.4.18				
			Lt.-Comdr. K. C. Helyar	May 1917		
Nugent .	10.4.17		Comdr. E. L. Cardale	16.3.17		
			Lt. Guy L. Warren	13.6.17		
Phoebe .	1.7.17	23.10.18	Lt.-Comdr. Gore Langton	6.7.17		
Laertes .	5.3.17	3.7.17	Comdr. F. Clutterbuck	6.12.15	14.4.17	
			Comdr. H. Haire Forster	14.4.17		
Lance .	5.3.17	4.7.17	Lt. G. Creswell			
			Lt. W. A. C. Salmond	31.2.17		
Landrail .	16.3.17	31.5.17	Lt.-Comdr. F. B. G. Hobart	9.3.15	12.5.17	
			Lt.-Comdr. C. S. Denison	12.5.17		
Lark .	1.3.17	10.4.17	Lt. John H. Jauncey	11.1.17		
Laverock .	5.3.17	18.4.17	Lt. H. Binmore	18.1.17		
Liunet .		10.4.17	Lt. J. H. L. Yorke	11.1.17		
Llewellyn .	5.3.17	5.6.17	Lt. W. A. C. Salmond			
			Lt. G. Creswell	2.5.17		
			Lt.-Comdr. R. A. Yonge	3.11.15	4.5.17	
Lochinvar	1.3.17	4.7.17	Lt.-Comdr. Knox Little	4.5.17	20.6.17	
			Comdr. W. Irvin	20.6.17		
			Lt.-Comdr. F. R. M. Johnson	5.2.17		
Lucifer .	1.3.17	2.6.17	Lt. M. Williamson Napier	6.7.16		
Lydiard .	9.3.17	27.5.17	Lt. C. R. E. W. Perryman			
Laforey .	5.3.17	Sunk, 23.3.17				
			Lt. A. E. Durham			
M 23 .	6.6.17	22.7.18	Lt.-Comdr. O. St. John			
M 24 .	7.10.15	3.1.19	Comdr. V. L. A. Campbell		19.5.16	
			Comdr. W. C. Castle	19.5.16	17.9.16	
			Lt.-Comdr. P. S. Rickord	17.9.16	28.7.17	
			Comdr. C. E. de Crespigny	24.7.17		
M 25 .	6.9.15	23.7.18	Comdr. B. H. Ramsay	26.8.15	25.10.17	
			Lt.-Comdr. A. C. Fawcett	25.10.17		
M 26 .	19.10.15	3.1.19	Lt.-Comdr. Cowan	16.2.16	4.2.17	
			Comdr. A. A. Mellin	4.2.17		
M 27 .	6.11.15	11.12.18	Comdr. M. Barne	6.9.15	1.2.18	
			Lt.-Comdr. G. Parker	1.2.18		
P 34 .	24.6.16	16.11.16	Lt. C. L. Evan Thomas	30.5.16		
P 47 .	14.3.18	1.1.19	Lt. W. H. Dunster, R.N.R.	5.3.18		

Ship.	Joined Flotilla.	Left Flotilla.	Rank and Name of Commanding Officer.	Date of Appoint- ment.	Date of leaving ship.	Remarks.
P 48	29.3.18	5.12.18	Lt. Ralph Kerr			
P 49	13.7.17	5.12.18	Lt. C. J. L. Bittleston	30.4.18		
P 50	22.3.17		Lt. K. L. Campbell	22.11.17	22.11.17	
P 52	25.11.18		Lt. C. H. Ringrose	9.4.18	9.4.18	
P 57	26.3.18		Lt. F. Raw	8.4.18	8.4.18	
			Lt. D. A. Stride			
			Lt.-Comdr. J. L. Sinclair,	10.11.18		
			R.N.R.			
			Lt.-Comdr. H. C. Birnie,			
			R.N.R.		5.9.18	
			Lt.-Comdr. A. P. Melsom,			
			R.N.R.	5.9.18	4.10.18	
P 58	8.7.18		Lt. W. A. Dumbleton	4.10.18		
P 64	30.3.18		Lt. J. R. Poland	July 1918		
M 21	15.10.17		Lt. M. G. B. Cox	20.3.18		
		Sunk,				
		20.10.18	Comdr. O. F. M. Stokes	25.8.17		
P 11	8.2.16	1.1.19	Lt.-Comdr. A. J. Landon	11.1.16	14.1.17	
			Lt. G. E. L. Atwood	14.1.17	30.11.17	
			Lt. M. P. C. Kerr	30.11.17	4.5.18	
P 12	1.3.16	19.11.16	Lt. N. Beaver	4.5.18		
P 17	26.2.16		Lt. J. H. Jauncey	10.2.16		
			Lt. R. E. Grant	6.5.15	12.5.16	
			Lt.-Comdr. Greig	12.5.16		
			Lt. J. C. Colvill	1.9.16		
			Lt. C. T. Beard		12.7.18	
P 19	21.6.16	19.11.16	Lt. W. A. Willock	12.7.18		
P 21	24.6.16		Lt. Sir J. Domville, Bart.	3.6.16	6.10.16	
			Lt. I. V. Colvin	6.10.16		
			Lt. W. R. Leycester	27.5.16	10.3.17	
			Lt. J. S. Hoffmann	10.3.17	11.12.17	
			Lt. G. Hannay	11.12.17	30.5.18	
P 23	27.6.16	29.8.17	Lt. A. W. Sprott	30.5.18		
P 24	29.1.16	4.12.18	Lt. J. M. Smith	31.5.16		
			Lt.-Comdr. W. Sandford	4.12.15	12.8.16	
			Lt. E. Hopkinson	12.8.16	1.11.17	
			Lt. F. W. Hawkrigde	1.11.17		



APPENDIX V

MEMORANDUM ON VISIBILITY BELOW WATER

THE first important point is that objects are only visible in water, or indeed anywhere else, because the light reflected from their surface differs in quality and quantity from that passing through the medium immediately surrounding the object back to the eye of the observer. For instance, a black object held between the eye and the sky is seen, because very little light is reflected from the black surface to the eye, whereas diffused light passing through the space surrounding the object enters the eye. The contrast between the light from each causes visibility. When we come to consider water, two other conditions arise.

1. The surface is rarely smooth, and secondly the water is never without particles of matter floating in it. As regards (1), ruffled water renders objects invisible to an observer close to the surface, because the inclination of the surface of the ripples causes refraction and reflection of the rays coming from the object to the eye. The result is that so few rays enter the eye from the object that the light reflected off the surface of the water obliterates the contrast. If, however, the eye be raised several hundred feet, a larger number of rays from the object meet the eye, and the object becomes visible. For this reason, and for of course the larger circle of view given by increased height, observation from air-ships and aeroplanes is valuable.

2. Impurities in the water act much the same as impurities in the air. The commonest impurity in the air is water, which in an aggravated degree causes mist or fog. In water, floating particles of mud or sand act much the same as fog—they reflect light from their surface. This has the effect of diffusing light, and stopping rays entering the eye from the object. It must be remembered that, in viewing objects from above water, five distinct effects occur.

(1) The light has to pass from the sun to the object. In doing so, in entering the water, a certain quantity of light is reflected

from the surface of the water into the eye of the observer. The quantity depends on the relative position of the sun and the observer.

For high altitudes of the sun this is small.

(2) Very little suspended matter will reflect light ; this causes at the time a considerable amount of diffused light to return into the eye.

(3) The object itself reflects light.

(4) The bottom reflects light.

(5) All the above rays are reduced in returning to the eye by stoppage from particles floating in the water.

The visibility of the object is therefore an integration of :

The difference of light entering the eye from the object and the surrounding water, the light in both cases having been reduced by :

1. Reflection of sunlight from surface.

2. Reflection and therefore loss of light to the rays proceeding to the object owing to particles floating in the water.

3. Similar reflection of light returning to the eye.

4. Loss of light owing to refraction from ripples in entering the water.

5. Loss of light owing to refraction emerging from the water.

6. Weakening of contrast due to diffused light entering the eye.

The main points regarding all this are that :

1. The visibility of an object depends on the contrast with its surroundings.

2. That the contrast will vary with the depth of the object below water, as its nearness to the bottom governs to a certain extent the contrast.

3. The shape of the surface of the boat, whether flat, concave, or convex, since the shape affects the light reflected, and has an important bearing on its visibility.

4. The colour and depth of the bottom. Obviously, therefore, the boat should be coloured according to the nature of the bottom she is going to be near, or the deep blue of the water if she is in deep water. As the aircraft is nearly over the vessel, vertical surfaces need not be considered, but rounded portions require separate treatment.

Shadow.—If the vessel is lying near the bottom on a sunny day, her shadow is of great importance. The sun's rays are parallel rays, and

therefore throw shadows. Unless the water is sufficiently impure to diffuse the light, a shadow of the boat will be thrown on the bottom when the boat is close to it. If the bottom is light sand, or white, a contrast in colour will be produced and therefore visibility. This is a matter requiring elucidation ; but one point is apparent, namely, that the area of the shadow depends on the relative positions of the sun and the boat and the altitude of the sun, the intensity of the shadow and therefore the difference in contrast, which depends on the nature of the bottom, the depth of water, the strength of light, and the nearness of the boat to the bottom.

In carrying out the trials ordered, the greatest care must be taken to discriminate between the different types of weather, and the state and transparency of the sea. The first thing, therefore, is to fix some standard visibility mark below water. From a standard height the mark should be used to record visibility according to the depth at which it can be seen. A submarine with its upper deck and round of hull painted black should fulfil the purpose for a sandy bottom.

The best place for the experiment would appear to be east of *Royal Sovereign* Shoal, and the best time a west-going neap-tide in calm weather. The days when the transparency of the sea and its condition will suit will probably be few, hence rapidity with the trials is important, and boats should be prepared to paint quickly with quick-drying paint, so as to alter their colour the same day.

APPENDIX VI

NAMES OF MASTERS OF CROSS-CHANNEL TRANSPORTS

<i>Invicta</i> . . .	}	G. Hancock, R. Carey, C. Cobb, W. Oates,
<i>Onward</i> . . .		W. Morrison, H. Emery, J. Harrison.
<i>Queen</i> . . .		These masters were interchangeable between
<i>Victoria</i> . . .		
<i>Princess Victoria</i> . . .		A. Blaxland.
<i>Golden Eagle</i> . . .		F. J. Adams.
<i>Arundel</i> . . .		W. Lidbetter.
<i>Princess Henriette</i> . . .		A. Lanwereins.
<i>Princess Clementine</i> . . .		G. Coucke.
<i>St. David</i> . . .		W. Mulhall.
<i>St. Andrew</i> . . .		A. E. Evans.
<i>St. Patrick</i> . . .		A. E. Davies.
<i>Newhaven</i> . . .		C. Cook.
<i>Brighton</i> . . .		H. Shortt, later followed by A. Hill.
<i>Dieppe</i> . . .		S. Marmery, later followed by H. Shortt.
<i>Stad Antwerpen</i> . . .		Act.-Comdr. Belgian Marine R. Ryez.
<i>Jan Breydel</i> . . .		" " " " E. Timmermans.
<i>Princesse Elisabeth</i> . . .		" " " " A. Grayet.
<i>Pieter de Coninck</i> . . .		" " " " H. de House.
<i>Ville de Liège</i> . . .		" " " " J. Rohaert.
<i>St. Denis</i> . . .		S. Smy.
<i>Anglia</i> . . .		L. Manning.

INDEX

- Abolard*, trawler, 380
Aboukir, H.M.S., xiii, 146
Acceptable, drifter, 344, 382, 384
Active, H.M.S., 33
 Adams, T. B., Lieutenant-Commander, xviii
 Adenkerke, gun-position, 191
 Admiral, place of in offence and defence, 338
 Admiralty, Constructive Department, 231, 240
 — Director of Naval Ordnance Department, 334
 — Stores Department, 148, 170, 398
Adventure, H.M.S., 33
Afridi, H.M.S., 157, 430
 Aga light-buoy, 174, 237, 284
 Air-ships, S.S., 38, 521, 575
Ajax II, drifter, 436
Alaburn, drifter, 429
Albyn, P.M.S., 142
Alert, Trinity House vessel, 156, 396
 Allen, Captain J. D., 366
 Allsop, Squadron Commander, 562
 Altham, Commander Edward, 30, 96, 191
Amazon, H.M.S., 53, 83, 89, 165, 341, 611
 Analysis of firings, 93, 194
Anglia, hospital ship, 127, 300
Apollo, H.M.S., 220, 262
 Archer, Commander Hugh, 139
Archuc, kite-balloon barge, 35
Argus, Trinity House vessel, 156
Aries, yacht, 425
 Armada, the Great, 2
 Armed escorts, 373
 Armstrong, Whitworth & Co., 204
 Army, Allied, assistance that could be rendered to, 455, 550
Arndilly Castle, drifter, 157, 429
Arrogant, H.M.S., 581, 590
 Aspinall, Colonel C. F., 214, 222
 Athlone, Earl of, 453
Attentive, H.M.S., 33, 86, 610, 611
Au Fail, drifter, 160, 432
Aventurier, French destroyer, 456, 612, 617
 Babbington, Squadron Commander, 56
 Bainbridge, Lieutenant R. S., 132
 Bairnsfather, Captain G., 323, 581
 Balfour, Right Hon. Arthur, xvi
 Balfourier, General, 452
 Ballard, Rear-Admiral G., 14
Balmoral, P.M.S., 535
 Barbier, Colonel, 452
 Barnes, Lieutenant, 130
 Barrage, Belgian Coast, 1916, effect on Dover area, 164
 — — — — — laying of, 156
 — — — — — 1917, reasons for laying, 168
 — — — — — rapidity of laying, 170
 — Goodwin-Saou, its weak points, 399
 — of mines first recommended to Admiralty, 70
 — — Folkestone-Grisnez, 70, 401
 Barrow, Lieutenant-Commander B. W., 359, 360
 Bart, Jean, 4, 47
 Bases, naval, never taken by sea forces, 69 *footnote*
 Batteries, considerations of attack on, 16, 500
 Beachy Head, battle of, 2
 Beatty, Admiral Sir David, 475
 Beck, Skipper James, 423
 Beedle, Lieutenant, 127
Begonia, drifter, 423
 Belgian Coast, attack on by Germans possible, 59
 — — — — — blockade by destroyers impossible, 55
 — — — — — difficulties of approach to, 150
 — — — — — effect of its retention by the Germans, 63, 224
 — — — — — patrol line typical day, 177
 — — — — — retention of enemy troops on, 62
 — — — — — survey by photographs, 232
 Belgians, H.M. the King of, 453, 545
 — — — — — danger of being kidnapped, 454
 — — — — — Queen of, 453, 545
 Bell-Irving, Lieutenant H. B., 398, 429, 437, 438
 Benn, Commander Hamilton, xxiv, 36, 472, 477
 Benwell, Captain, 323, 447

- Bernard, Commander M., 341
 Betts, Flight Sub-Lieutenant, 559
Biarritz, mine-laying ship, 156
 Bickford, Brigadier-General, 585
 Bickford, Commander, 23, 183, 191, 460
 Bigot, Commandant, 456
 Bigsworth, Flight-Commander, 529, 532
 Bird, Captain F., xxiv, 81, 396, 416, 421, 424
 Blake, Captain J. T., xxiv, 323
 Blockade, comparison 1805 and 1915, 9
 — of Belgian Coast by destroyers impossible, 55
 Blocking Belgian ports, reasons against, 265
 — French ports, possibility of, 65, 457
 — method of clearing, 267
 — Ostend, plans for in 1915, 263
 — — and Zeebrugge, reasons against, 268
 — simplicity of against large ships, 266
 Blount, Commander R., 22, 29
 Boarding-steamers, armed, 370, 372
 Bolger, Sub-Lieutenant, 378
 Bombardment, arrangements for by vessels on patrol, 105
 — difficulties caused by press comments, 99
 — night, method of, 95
 — of batteries by ships, uselessness of, 16, 89
 — of Bruges arranged for, 183
 — of Ostend, June 1917, 103
 — — September 1917, 105
 — preparations for, 99
 — Zeebrugge, September 1916, 83
 — — May 1917, 101
 Bombs dropped, weight of, 565, 568, 571
 Boothby, Lieutenant-Commander, 424
Boika, H.M.S., 167, 455
Bouchier, French destroyer, 456
 Boulogne, blocking possibility of, 65
 — bombardment by Lord Nelson, 10
 — Harbour silting up, 311
 Bowring, Captain Humphrey, 21, 88, 415
 Boyce, Lieutenant-Commander Woolcombe, 361
Brantabas, French destroyer, 456
 Braye Dune preliminary gun-position, 192
 Bridge, Skipper Charles, 432, 433
 Bridges, Major-General Tom, 453
Brighton Queen, loss of, 139
Brilliant, H.M.S., 614, 615
 Broadstairs, volunteers, services of, 371
 Brock, Commander, 474
Broke, H.M.S., 106, 170, 331, 351
 Bromet, Squadron Commander G. R., 549
 Brown, Commander John, 35
 Bruges becomes a base, 606
 Bruton, Captain C. W., 30
 B.S.T. British summer-time, 493
 Buckland, Lieutenant A. E., 139
 Buoys, indicator, 418
 Buoys, spar used on patrol line, 164
Bustard, I.M.S., 89, 613
 Butler, Lieutenant, 378
 Calais, protection against blocking, 457
 — possibility of blocking, 65, 457
 Calder, Lieutenant-Commander, 425
 Callaghan, Admiral of the Fleet Sir G., xviii
Campanula, drifter, 379, 382
 Campbell, Lieutenant-Commander C. O., 590
 Campbell, Commander Victor, 364
Canterbury, H.M.S., 349
Capitaine Mehl, French destroyer, 361
 455, 456
Carcass, D.B.F., 370
Carmania II, trawler, 136
 Carson, Right Hon. Sir E., xvi
 Carter, Commander Norman, 30, 84, 88
 Caswell, Lieutenant, 460
 Censors special for Great Landing, 238
Cerberus, D.B.F., 370
Ceylon, D.B.F., 370, 378
 Chain-sweeping, 118, 295
 Chambers, Lieutenant-Commander, xxiv
 Channel Tunnel, probable effect on the war, 66
Char, tug, 388
 Chase, Flight Sub-Lieutenant, 560
Chelmsford, P.M.S., 140
Chester, D.B.F., 370
Chichester, D.B.F., 370
Chub, D.B.F., 370
Chrysanthemum, drifter, 429
 Churchill, Right Hon. Winston, ix, xvi, 17, 521
City of Dundee, trawler, 129
City of Glasgow, drifter, 380
City of Oxford, kite-balloon ship, 35
 Clarke, Able Seaman Sidney, 353
Claud Hamilton, drifter, 382
 Clayton, Flight Sub-Lieutenant, 539
Cleopatra, H.M.S., 160
Clive, Lord. See *Lord Clive*
Clower Bank, drifter, 159, 422, 429, 431
 Coastal motor-boats, 468, 469, 471
 — — discrimination in use, 468
 Coles, Lieutenant, 129
 Collard, Captain B. St. G., 30, 206
 Collet, Flight Sub-Lieutenant, 544
 Commodore, T., 104, 292, 316
 Condy, Lieutenant H. B., 438
Conqueror, tug, 238
 Cook, Skipper, A. E., 438
 Coppinger, Commander, 83
Corona, drifter, 379, 380
Cosmos, drifter, 422

Cossack, H.M.S., 83, 612
 Coventry Ordnance Works, 17, 186
 Cowell, Walter, second hand, 438
 Crafter, Lieutenant, 422, 431
 Crampton, Brigadier-General, 585
Craufurd. See *General Craufurd*
Cressy, H.M.S., xiii, 146
 Crouch, Sub-Lieutenant, 536
Crusader, H.M.S., 83, 359, 614, 615, 618
 Cunningham, Lieutenant, 575

Dagon, trawler, 128
 Daimler-Foster tractors, 184
 Dalbiac, Lieutenant, 533
 Dallas, Flight-Lieutenant, 567
 Dampier, Rear-Admiral C. F., 582
 Dance class, paddle-mine-sweepers, 37
 Dangerous areas, number of, 133
 — description of, 117, 294
 — reduction in 1918, 133
 Daniels, Lieutenant, 141
Datum, drifter, 436
 Davidson, Skipper William, 423
 Davis gun, 569
 De Burgh, Hubert, 1, 609
 Decision, rapid, necessity for, 503
 De Curzon, Enseign de Vaisseau, 456
 De Mariave, Rear-Admiral, 92, 161, 170, 443, 445
 De Robeck, Vice-Admiral, 368
 De Sincay, Lieutenant Comte, 532
 Destroyers, British, inferior numbers, reasons for, 69, 331
 — Dover, routine of, 329
 — duties on cross-Channel escort, 306
 — inferior gun-power, 159, 332
 — necessity for being at the ready, 329
 — effect of wash of, 104, 256, 272
 — German, superior range of guns, 159
 — use of torpedoes, 333
 — laying long line of mines, 174
 — variation of speed in shallow water, 101
Devon County, drifter, 424
 D'Eyncourt, Sir Tennyson, 231, 240, 490
Diane, yacht, 157, 427, 429, 438
 Dieppe, traffic to, 323
 Diggle, Commander Neston, 33
 District Naval Transport Officers, 322
 — names of, 323
 Division, 1st of British Army, 243, 258, 259
 Donovan, Lieutenant, 460, 462
 Dorling, Commander Taprell, 158
 Dover Area, difficulties of, 53, 68, 70
 — extent of, 51
 — number of vessels passing through, 291
 — vital interests of, 51, 55, 58

Dover Harbour, blocking entrance possible, 62, 65, 588
 — congestion of, 120
 — early history of, 13
 Downs, defence, conditions of, 56, 383, 386
 — delay of, shipping, in, 375
 — losses in, 388
 — obstruction in, 372
 Drifter crews, plucky conduct of, 342
 — good service of, 441
 Drifters, Dover, attack on October 1916, 436
 — laying 1916 barrage, 427
 Drift-nets, description of, 416
 — reasons for abandonment of, 305
 Duff, Rear-Admiral A. L., xvi
 Dumas, Captain Philip, xvii
 Duncan's Tower, 458
 Dunkirk Aerodrome, attack on, 537, 572
 — blocking possible, 61, 457
 — closing of locks at night, 298
 — escape of Jean Bart from, 5, 6
 — harbour, 446
 — precautions in roads, 448, 450
 — raids on, 446
 — roads, 448
 Dutch neutral waters, 148, 151, 158
East Briton, drifter, 424, 427
E.B.C., drifter, 436
 Edwards, Commander, 560
E.E.S. Trawler, 127, 140
Eglington, P.M.S., 127, 140
 Eglington, Lieutenant W. E., 127
 Eldridge, Commander G. B., 393
Electra II., trawler, 130
 Electrically controlled boat, description of, 172
 Elkington, Mr. V., 584
Elysian, trawler, 127
Emden, 46
Enseigne Roux, French destroyer, 456
Equinox, trawler, 133
Erebus, H.M.S., 26, 94, 99, 171, 248
 — attack by electrically controlled boat, 173
Erna, trawler, 136
 Escort, objects of, 306
 Essentials in making out plans, 486
Estandard, French destroyer, 456
Étoile Polaire, trawler, 129, 131
Eugène. See *Prince Eugène*
 Evans, Captain E. R., 21, 28, 62, 70, 353, 507
 Evans, Sub-Lieutenant, 424
 Eves, Skipper C. E., 381
Excellent, H.M.S., 89, 613
Falmouth III, trawler, 127

- Farley, Mr., Mayor of Dover, 595
Faulkenor, H.M.S., 34
 Favercau, Vice-Admiral, 443, 612, 617
Fearless, drifter, 91, 423
Feasible, drifter, 382
 Ferrand, Flight Sub-Lieutenant, 534
 Firing errors, their correction, 75, 93, 195
 Fisher, Admiral of the Fleet, Lord, viii, xvi, 17, 110, 332, 387, 454
 Fisher, Captain W. W., xvi
 Flash of guns, 352, 354
 Flint, Major Charles, 460
Flirt, H.M.S., 341
 Flotilla, 6th, 34
 Foch, Mareschal, 451
 Foreland, North, Battery, 359, 367, 385
 — battle of, 2
 Foreness Battery, 359, 367, 385
Foresight, H.M.S., 613
 Foster, Messrs., of Lincoln, 188
 Four days, battle of, 2
 Fowler, Flight-Lieutenant, 566
 Fowler, H., ordinary seaman, 353
Frasenburgh, drifter, 431
 Fraser, Commander J. S., xxiv, 22, 101, 279
 Fraser, Lieutenant, 429
 Frederick the Great, 485
 French Coast, West, protection of, 456
 French, Field-Marshal Viscount, xviii, 16, 89, 214, 228, 601
 French torpedo-boats, 299
 Froude, Lieutenant, 373
 Furness, Sub-Lieutenant, 157

 Galbraith, Flight Sub-Lieutenant, 552
 Gard, Mr., Chief Constructor, 203
 Garnett, Commander Herbert, 33
 Gasche, Émile, 374
 Gask, Fleet Paymaster Walter, xxiv, 22
Gatwick, P.M.S., 141
 Geddes, Right Hon. Sir Eric, 314
General Craufurd, H.M.S., 30, 94, 274, 276, 445
 — at Ostend, 86, 88
 — at Zeebrugge, 90, 422
 — landing guns, 190
General Wolfe, H.M.S., 30, 94, 157, 206, 247, 445
George V, drifter, 438
Ghurka, H.M.S., 83, 132, 361
 Gibbs, Commander Valentino, 158
Girl Annie, drifter, 490
 Gladstone, Commander Edward, 33
Gleaner of the Sea, drifter, 157, 430, 436
Glen Afton, drifter, 158, 430
 G.M.T in war, 493
 Goble, Flight Sub-Lieutenant, 551
 Godfrey, Lieutenant, 422
Goodwood, P.M.S., 140

 Gow, Lieutenant Observer, 101, 566
 Grace, Captain H. E., 366, 379
 Graham, Flight Sub-Lieutenant B., 535
Gransha, special service vessel, 89
 Grant, Captain H. C., 23
 Grant, Rear-Admiral Heathcote, 582
Great Heart, drifter, 423
 Greville, Commander, 590
 Grey, Squadron Commander Spencer, 529, 562
Greyhound, S.S., loss of, 349
 Grid, use of, in correcting fire, 79
 Groves, Wing Commander, R.N., 533, 564
 Gun mounting 18-inch, for Westende, 200
 — — — bombardment of Bruges arranged, 200
 Gun, 18-inch, monitors fitted with, 202
 — proposed method of transport, 204
 — 12-inch at Oost Dunkirk, 191
 — at Adenkerke, 192
 Gun platform, 187
 Gun-truck, 188
 Gush, Commander H. W., 323
 Guy, Capitaine de frégate, 456
 Gyles, Mr. Donald, 353

 Haig, Field-Marshal Earl, xviii, 94, 214, 228, 230, 601
 Halahan, Captain H., 184, 458, 458
 Hamilton, Captain F. W., 323, 447
 Harland, Lieutenant, 430
Harrier, H.M.S., 368, 370
 Haskin, Flight-Commander, 533, 542
Hazard, H.M.S., 33, 613
 Hely D'Oisel, General, 452
 Hempson, Sub-Lieutenant, 373
 Henderson, Captain Arnot, 582
 Hercus, Lieutenant E. D., 23, 234
Hero, trawler, 136
Herring Searcher, drifter, 422
H. E. Stroud, trawler, 127, 129, 340, 436
 Harvey, Major, 185, 192, 198
Highlander, trawler, 132, 134
 Hill's Pocket, 449
 Hindenburg Battery, 86, 104
Hogue, H.M.S., xiii, 146
 Hood, Rear-Admiral Hon. H., 15, 17, 18, 184, 308, 371, 610, 616, 617, 618
 Houth, Sub-Lieutenant, 360
 Howard, Captain Vansittart, xxiv, 21, 113, 302
 Howitzers 15-inch, 17, 186
Hull Trader, S.S., 129
Humber, H.M.S., 610
 Hunter-Weston, Major-General Sir A., xviii, 214, 220, 222
 Hurd, Mr. Archibald, xxiv
 Hurren, Skipper, 430

Hyacinth, drifter, 91, 423
Hydrophones, 124, 138

Important personages, precautions regarding, 137
 Improbable, trial of landing, 228, 270, 421
 Ince, Sub-Lieutenant Observer, 535
 Indirect aiming, method of, 77
 Inland Water Transport 299
Intrepid, French destroyer, 612, 617
 Iron, Captain John, 589, 590
 Irvine, Lieutenant, 379, 380
 Irving See Bell-Irving

Jackson, Admiral of the Fleet, Sir H.,
 xvi, 109, 150, 230, 261, 393
 Jacobenessen, battery, 104
James Fletcher, trawler, 424, 426
 Jellicoe, Admiral of the Fleet, Viscount,
 xvi, 105, 203, 230, 231, 269, 276, 286,
 367, 401, 406, 410, 411, 413
 Jenkins, Engine Room Artificer, 585
John Moore. See Sir John Moore
John Roberts, drifter, 427, 431
 Johnson, Commodore Charles, 21, 159,
 447
 Johnson, Flight-Lieutenant, 530

Kaiser Wilhelm II Battery, 101, 145
 Kapok, for nets, 417
Kate Lewis, trawler, 136
 Koeble, Flight Sub-Lieutenant, 559
Kempton, P.M.S., 141
 Keyes, Rear-Admiral Sir R., xxii, 286,
 410
 Kiddle, Commander K., 33
 King, His Majesty the, 14, 301, 317, 422,
 431, 457, 545, 594
 King, Lieutenant-Commander, 460
 Kite-balloon, destruction of, 546
 Kite-balloon, 35
 Knocke Battery. See Kaiser Wilhelm II
 battery
Kwango, German vessel, 377

Lady Brassey, tug, 589
Lady Crundal, tug, 378, 589
Laertes, H.M.S., 349
Lafory, H.M.S., 348
 Lambe, Wing-Captain C. L., xxiv, 23,
 530, 548, 552, 556, 577
 Landing by Germans on Belgian Coast,
 possibility, 59, 450
 Landing, feigned, September 1915, 90
 ——— September 1916, 94
 ——— Great, composition of force, 243
 ——— method of gauging tides, 234
 ——— modified, ruled out by Commander-
 in-Chief, 259
Lark, H.M.S., 349
Launch Out, drifter, 436

Laverock, H.M.S., 345, 346
 Lawrie, Commander E. W., 89
 Le Chapon, internment camp, 243, 259
 Lewin, Commander, 133, 361
Liberty, hospital ship, 238
 Light-buoys on patrol line, 156, 161, 164
 Lights, navigational, necessity for main-
 taining, 297
 Lillicrap, Mr., constructor, 231, 240
 Litchfield-Speer, Captain F., 156
Llewellyn, H.M.S., 348
 Lloyd, Captain Douglas Pennant, 322
Lochinvar, H.M.S., 345
 Longmore, Wing-Commander A. M., 528,
 533
Lord Clive, H.M.S., 30, 86, 91, 92, 94,
 206, 247, 445, 545
 ——— at Zeebrugge, August 1915, 84
 ——— disguised as a long-range moni-
 tor, 193
Lord George, trawler, 128
Lord Roberts, H.M.S., 238
 Losses of merchant ships, 302
Loyal Star, drifter, 383
Lusitania, coasting vessel, 127
Lydiard, H.M.S., 101
 Lyne, Commodore Hubert, 285, 447

Macfarlane, trawler, 130
 Mack, Flight-Lieutenant, 524, 528
 Maclean, Captain Colin, 475
 Macmullen, Colonel, 231
Maiveen, drifter, 422
 Maginnis, Mr., Chief Constructor, 231
Magon, French destroyer, 455, 456
 Maguire, Lieutenant, 89
 Mahan, Admiral, 387
 Maidstone, Lieutenant-Commander
 Lord, 460
Majesty, drifter, 382
Maloja, P. and O., 126, 302
 Man, Commander J., 323
Maori, H.M.S., 359
Marcella, yacht, 388
 Marescaux, Captain A. E., 323, 447
Marmion, P.M.S., 423
Marshal Ney, H.M.S., 26, 90, 359, 367,
 385, 424
Marshal Soult, H.M.S., 26, 28, 94, 98,
 171, 248, 445
Mary Cowis, drifter, 429
 Mathew, Fleet-Surgeon, 590
Mayfly, air-ship, 520
 Mayo, Admiral, 106
 Measurement of distance by taut wire,
 237, 279, 283
 Mechanism, value of, in operations, 487
 Meddis, A. M., 529
Medea, H.M.S., 158
 Meloy, Edward, 374
Melpomene, H.M.S., 158

- Memorandum on chances of success of
Great Landing, 249
— — — reasons for an advance on Belgian
Coast, 1917, 223
— — — — instituting Belgian Coast bar-
rage, 1916, 143
— — — — — 1917, 168
— — — — — landing in Ostend, 210
— to Admiralty re traffic control, 113
— to destroyers after night-raid, 343
— to drifters, 436
— to monitors in the Swin, 238
— to ships on Belgian Coast Patrol, 162
Menelaus, kite-balloon ship, 89
Mentor, H.M.S., 354, 455
Merchant Navy, spirit of, 302
Merchant vessels sunk, 302
Mermaid, H.M.S., 83
Mersey, H.M.S., 610
Middelkerke bombardments, 90, 94
Mills, Flight-Lieutenant, 529
Mills, Mr. R. C., xxiv
Milne, H.M.S., 158, 364
Mine barrage, Folkestone-Grisnez, 400
— first recommended to Admiralty,
150, 400
Mine-field, discussion of, 400, 404
— German first laid, 19
— necessity for accurate fixing, 499
— shallow, Folkestone barrage, 404,
411
Mine, German, description of, 110
Mine-laying, by trawlers, 135
Mine-laying, destroyers laying long line,
176
Mine-nets, description of, 419
Mines laid by us on Middelkerke bank,
167
Mine-sweepers, paddle, 137
Mine-sweeping at night, 140
Mine-sweeping, distances swept, 113
— fixed routine necessary, 134
Mining of shoals, uselessness of, 494
Mining school, 397
Moewe, German raider, 46
Mohawk, H.M.S., 360
Molteni, Captain V. B., 25, 89
Mondesir, General, 452
M. 24 (Monitor 24), 173
Monitors, disadvantage of having only
bow fire, 88
— in Downs, 367
— isolation in Middle Deep, 238
— limitation of reserve guns, 98
— M. Class, 32
— used against Zeppelins, 592
Monk, General, 2
Montgomery, Major-General, 243
Montrose, F.M.S., 140, 141
Montrose, S.S., loss of, 377
Moora, H.M.S. See *Sir John Moore*
Moorsom, Commander Winstanley, 366
Morale, German, loss of, reasons for, 335,
605
Moreton, Captain J., 30, 206
Morgan, Lieutenant L. V., 22, 125
Morgan, Lieutenant W. G., 128
Mouget, Commandant, 456
Muir, Lieutenant, 431
Mulock, Flight Sub-Lieutenant, 531,
533, 539
Murray, H.M.S., 158
Mussel, H.M.S., 584
Myngs, H.M.S., 349
Navigational lights, 297
Nelson, Lord, 4, 8, 12, 357
Nepaulin, P.M.S., 140, 141
Net area, 305
Nets, drift, description of, 416
— mine, laid at North Goodwin, 382,
434, 347
— — description of, 419
Neutral waters, 148, 151, 158
Ney, *Marshal*. See *Marshal Ney*
Niger, H.M.S., 370, 372
Ninrod, H.M.S., 170
North, Chief Skipper, 134
North Foreland, battle, 2
— — Battery, 359, 367, 385
North Star, H.M.S., 174
Norton, Flight Sub-Lieutenant, 548
Notre Dame de Lourdes, 456
Nubian, H.M.S., 89, 156, 342, 344, 361
Nutting, Lieutenant, 538
Obusier, French destroyer, 160
Oldfield, A. M., 534
Oliphant, Commander Henry G., 83, 165
Oliver, Vice-Admiral Sir Henry, xvii, 106,
237, 261, 269, 286, 401, 485
Ombra, yacht, 340
Operations, cancellation of, 99, 496
— Committee, 13, 282, 285, 508
— considerations guiding choice of, 494,
506
— latitude in orders, 504
Ori flame, French destroyer, 456
Orvieto, mine-laying ship, 155
Ostu, mine-sweeping trawler, 135, 136
Ostend, blocking plans for 1915, 263
— — tide conditions necessary for, 232
— bombardment of, September 1915, 85
— — June 5th, 1917, 103
— — September 1917, 105
— relinquished as a base, 105
Ostrich II, trawler, 132
P. Class boats, 364
P. 11, 349
P. 24, 349
Palmer, Commander, A. R., 37

Palmer's Engineering Works, 584
Paragon, I.L.S., 348
Paramount, drifter, 350, 380, 381, 382
Paris, mine-laying ship, 156, 408
 Parsons, Commander B., 139
 Parsons, Engineer Commander W., 23, 331, 583
 Paton, Captain W. D., 29
 Patrol, Belgian coast, attacks on, in 1916, 165
 ——— summary of work on, 165
 Patrol, destroyer, disposition of, in 1917, 358
 Payne, Rear-Admiral Godfrey, 557
 Peal, Lieutenant, 536
 Peary, trawler, 89
 Peck, Commander Ambrose, 353
Peel Castle, D.B.F., 388
 Penley, Flight Sub-Lieutenant, 539
Persistive, drifter, 426
 Petre, Flight-Lieutenant, 539
 Peyronnet, Enseign de Vaisseau, 456
 Phillips, Lieutenant Commander, 481
 Philpotts, Rear-Admiral, 106
 Photographic camera mounted in aero-plane, 525
 Photographs, aerial, height taken at, 565
 — surveying by, accuracy of, 234
Pitfour, trawler, 136
Pleasant, drifter, 436
 Pontoons, evolution of the idea of, 229
 — method of transportation from Swin to Dunkirk, 245
 — practice with, in the Swin, 231, 242
 — tonnage of, 230
Port Nicholson, S.S., 140
Present Help, drifter, 381, 382
Prince Eugène, H.M.S., 30, 90, 94, 157, 206, 247, 422, 424, 445
Prince Rupert, H.M.S., 30, 84, 86, 94, 165, 166, 238
Princess Margaret, mine-laying vessel, 156, 408
 Pitor, Mate T. J., 91, 423
Protect, drifter, 437

Queen, transport, 342

 Raids by German destroyers, October 1916, 339
 ——— November 1916, 344
 ——— March 1917, 345
 ——— March 1917, 348, 350
 ——— April 1917, 351, 359
 Raids on Belgian Coast Patrol Line, possibility of, 163
 — on Channel by large cruisers, possibility of, 65
 ——— by destroyers in force, 292, 307
 ——— precautions against, 65
 Ramsay, Mr., 331, 584

Ramsgate, air raids on, 376
 — drifters, 372
 — impossibility of protection, 388
 Rawlinson, Lieutenant-General Sir H., xviii, 222, 240, 243, 259
 Rawson, Commander H., 238
Redcar, P.M.S., 140, 141
Redoubtable, H.M.S., 25, 86, 89
 Redpath, Mr. R., 186
Redwald, drifter, 385
 Rehcarals, points regarding, 490
Revenge, H.M.S., 25, 26, 79
Reward, drifter, 424
 Ridges on Belgian coast, determination of depth, 236
 Rigg, Commander, 113, 137, 139
 Rinteln, Franz, 374
Riviera, H.M.S., 93, 349, 552, 541
Roberts, Lord. See *Lord Roberts*
 Roberts, Lieutenant E., 128
 Robinson, Lieutenant Lionel, 84
 Robinson, Able-Seaman Leonard, 353
Roeburn, drifter, 436
 Rodwell, Skipper John, 426
 Ronarc'h, Admiral, xxiv, 16, 170, 229, 398, 445
Rooke, drifter, 380
 Rouquerol, General, 191, 193, 425
 Rowles, Able Seaman William, 353
Rupert, Prince. See *Prince Rupert*
Russel II, trawler, 136

Sabreur, trawler, 351
St. German, trawler, 131
 St. John, Lieutenant-Commander, 173
 St. Joseph's farm, 192
St. Maurice, trawler, 136
 St. Seine, Marquis de, 17
 Sailings of transports, table of, 133
 Sampson, Wing-Commander, 522
Sanda, yacht, 83, 90, 422, 423
Saracen, H.M.S., 83, 89
 Saunders, Captain W. J., 366, 379
 Saurin, Commander, Gerald, 36
Savitri, trawler, 136
 Scarlett, Skipper, 91, 423
 Scott, Admiral Sir Percy, 208
 Scouts, Sea, 370
 Sea-planes, limitations of, 554, 570
S.D. Lambert, loss of, 302
S.D.T. drifter, 424
 Senior Naval Officers at ports, 322
Seyern, H.M.S., 610
Shenandoah, S.S., 130
Shipmales, drifter, 423
 Shoals, value of, in navigation, 494
 Shoppee, Lieutenant, 184, 458, 611
 Shortridge, Mr. A. D., 21, 582
 Signals, care necessary in wording, 349
 Simms, Flight Sub-Lieutenant, 526, 528,
 540

- Truck for gun-mounting, 189
Try Again, drifter, 381
 Tufnell, Lieutenant, 460
 Tunnel Channel. *See* Channel Tunnel
 Tunnel class mine-sweepers, 138
 Tweedie, Captain Hugh, 27
 Tyrer, Lieutenant, 563
 Tyrwhitt, Commodore Reginald, ix,
 xvii, xviii, 50, 104, 147, 158, 160, 246,
 269

Ure, H.M.S., 83
U. 48, 381
U.C. 61, 457

 Vaughan-Lee, Rear-Admiral, 577
Venerable, H.M.S., 25, 614, 615, 616
 Venn, Commander, 160, 422, 423, 431,
 432
Vernon, H.M.S., 172
 Vessels sunk in Dover area, 291
Vestal, H.M.S., 612
Vestal, Trinity House vessel, 156
 Vickers, Messrs., gun-mounting, 198
Viking, H.M.S., 28, 83, 360
Vindex, sea-plane carrier, 541
Vindictive, H.M.S., 280, 285
 Viney, Flight Sub-Lieutenant, 532
 Vincy, Lieutenant-Commander, 83
Violet II, 422
Virgin del Socorro, German vessel, 380
 Visualising in advance necessary, 506
Volscian, S.S., 131
 Von Spee, Admiral, 608
 Von Tirpitz, Admiral, 47

Wahine, mine-laying ship, 396
 Walde light, 299
 Waller, Mr. M. M., xvii, 148, 508
 Warneford, Flight Sub-Lieutenant, 529
 Warren, Lieutenant Guy, 341
 Waters, Skipper, 131
Waterville, S.S., 381
 Watson, Sub-Lieutenant, 424, 429

Waverley II, drifter, 436
 Weight of bombs dropped by air-craft,
 565, 568, 571
 Welman, Lieutenant-Commander, xxiv,
 469
 Wemyss, Vice-Admiral Sir Rosslyn, 286,
 410
 Westend, bombardments of, 89, 91,
 92, 94
 Wigram, Captain E., 20, 216
Wildfire, H.M.S., 612, 613, 616
 Wilhelm II Battery. *See* Kaiser Wil-
 helm II battery
 Williams, Commander T., 360
 Williams, Staff-Paymaster, 460
 Wills, Captain C. S., 30, 173
 Wilson, Admiral of the Fleet, xvii, 261,
 419, 485, 497, 505
 Wilson, Captain, Canadian Engineers,
 185, 460
 Wilson, Flight-Lieutenant, 529
Wolfe, H.M.S. *See* *General Wolfe*
 Woodhall, Commander, 323
 Woolcombe - Boyce, Lieutenant - Com-
 mander, 361
 Wooley, Paymaster, C. E., 590
 Wreath at funeral of German officers, 358

 Yachts, armed, 38
 Yates, Engineer Lieutenant-Comman-
 der, 585
 Yelverton, Rear-Admiral Bentinck, 323
 Yerburch, Lieutenant Windall, 234
 Young, Lieutenant Dawborn, 473

 Zareba of nets, 81
 Zebrugge locks, visible size of, 97
 — bombardment, replica laid out in
 Thames, 80
 Zeppelin drops bombs on Ramsgate, 389
 — destruction of, 529
Zero, small air-ship, 545
Zubian, H.M.S., 344
Zulu, H.M.S., 156, 344, 361

- Sirius*, H.M.S., 614
Sir John Moore, H.M.S., 84, 94, 274, 424, 545
 Sluys, battle of, 2
 Smart, Mr., Admiralty Constructional Officer, 331
 Smith, Skipper James, 430
 Smoke, 278
 Smoke-buoys, 255, 476
 Smoke, chlorosulphonic, 278, 474
 — screen, overhead, 475
 Smyth-Piggott, Flight-Commander, 530
Soult. See *Marshal Soult*
 Souter, Skipper, 429
 Spencer, Commander II., 37
Spotless Prince, drifter, 436
 Spotting for gun-fire, 77
 — by aeroplane, 92, 101, 104, 105, 193
 — by fixed observation stations, 78
 Stark, Chief Engineer, 130
 Stores Department, Admiralty, 148, 170
 Strategy, faulty of Germans, 49
Strathcoe, trawler, 136
Strathgairn, trawler, 131
 Strickland, Major-General, 243, 259
 Strouger, Skipper A., 429
 Submarines, as observation stations, 479
 — C. 17, 174
 — Dover, employment of, 478
 — difficulty of assessing attack on, by air-craft, 555
 — E Class, 480
 — experiments with, 481
 — fitted as light-buoys, 399, 479
 — for submerged creeping, 220, 479
 — for tidal measurements, 174, 234, 480
 — friendly, precautions regarding, 478, 481
 — surface attack by, 304
 Sueter, Commodore Murray, 521, 577
 Summer, time in operations, 493
 Surrender at night, 356
Sussex, S.S., 140, 457
 Swan, Chief Engineer, 27
Swift, H.M.S., 331, 351
Syrus I., Norwegian steamer, 379

 Tactics, German destroyer, unsound, 353, 605
 Tanks, use of, in Great Landing, 239
 Tanner, Lieutenant, 424
Tarpon, H.M.S., 167
Tartar, H.M.S., 83, 361
 Taut wire gear for measuring distances, 237, 279, 283
T.B., No. 4, 349, 389, 581
 — No. 24, 83
 Teck, Prince Alexander of, 453
 Tenneyson, Sub-Lieutenant the Hon. H., 360

Terror, H.M.S., 26, 92, 99, 106, 170, 171, 248
The Norman, trawler, 136
 Thirty-knotters, 35
 Thornton Ridge, variation of water on, 84
 Thouroude, Commandant, 456
 Throlfall, Lieutenant, 26
 Tides, method of gauging, 233
 — on patrol line, 174
 Tipping, Lieutenant-Commander Gartside, 90, 422, 594
 Tirpitz Battery, 88, 104
 — bombardment of, 193
 Tomlin, Captain G. N., xxiv, 21, 366, 371, 377
 Torpedo carried in German sea-planes, 437, 572
Toward, S.S., 425
 Tower, Lieutenant, 458
 Traffic, control of, 297
 — Cross-Channel, protection of, 304
 — danger to, at night, 300, 304
 — holding up, loss of tonnage by, 294, 295
 — percentage, losses of, 291
 — protection of routes *versus* areas, 114
 — raids on, 305
 — vessels passing Dover, numbers of, 291
 Transport, Inland Water, 299
 Transports, cross-Channel, complaints regarding, 317
 — day running, reasons for, 305
 — distinguished passengers, 316
 — double sailings, 308
 — enemy attack on defeated, 315
 — loss of leave owing to non-sailing, 309
 — lying alongside Folkestone, 318, 321, 506
 — names of masters, Appendix VI
 — numbers carried by, 315
 — persistence in sailings, 309, 316
 — sailing before sweeping, 314
 Trawlers, distance swept by, 113
 — losses in personnel, 308
 — mine-laying by, 135
 — removal of wheelhouse doors, 132
 — rest of, so called, 122
 — salvage of aeroplanes by, 134
 Trenchard, General, 552
 Tribal class destroyers, 34
 — losses in, 359
 Trinity House Elder Brethron, 397
 — vessels, 156
 Tripods for observation of fire, 78, 83, 89, 421
 Tritton, Sir William, 188
 Troup, Lieutenant H. R., 158
 Truck for gun transport, 184, 188